

COMPUTER MAGAZINE OF THE YEAR*

NOVEMBER 1986

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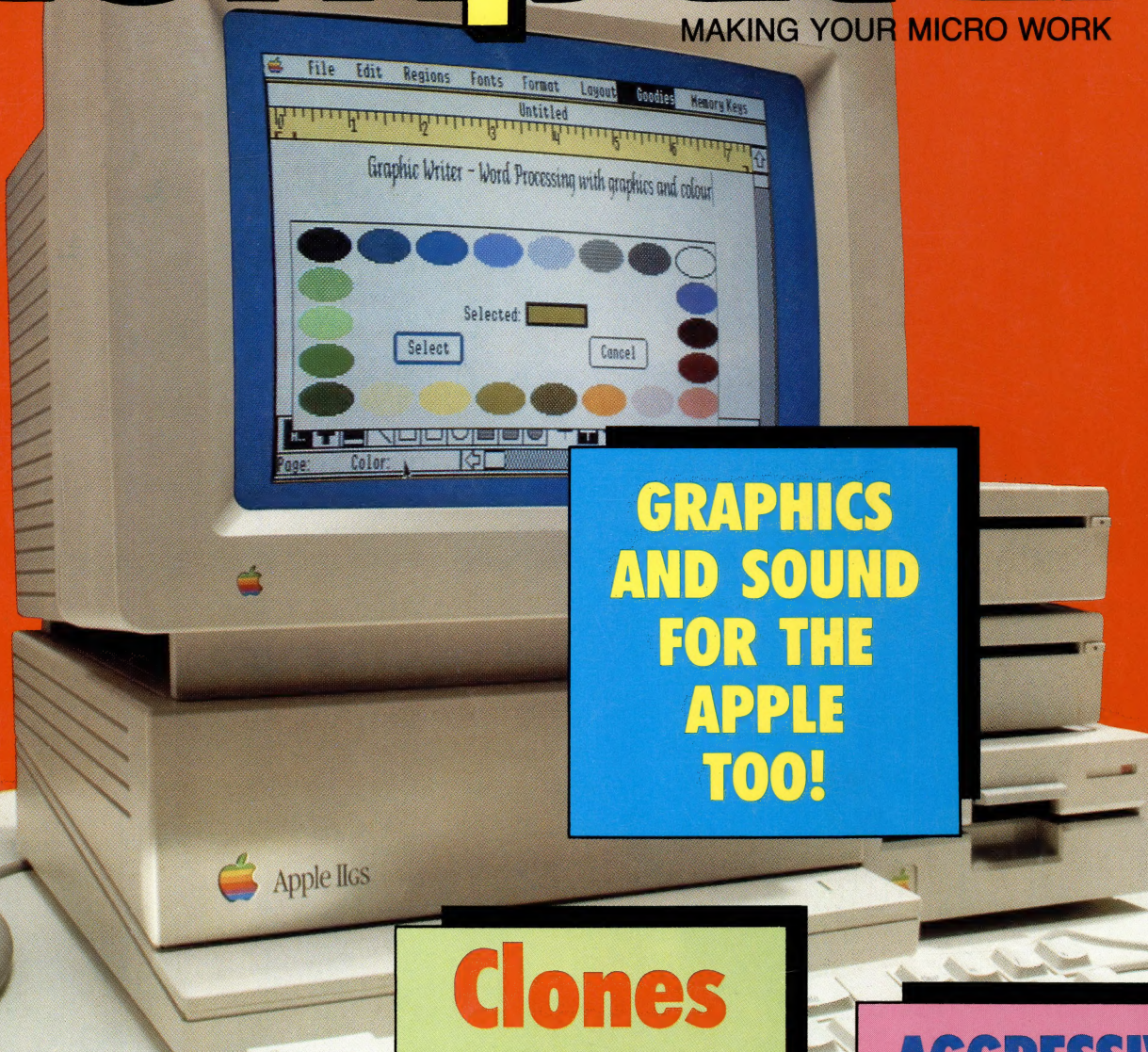
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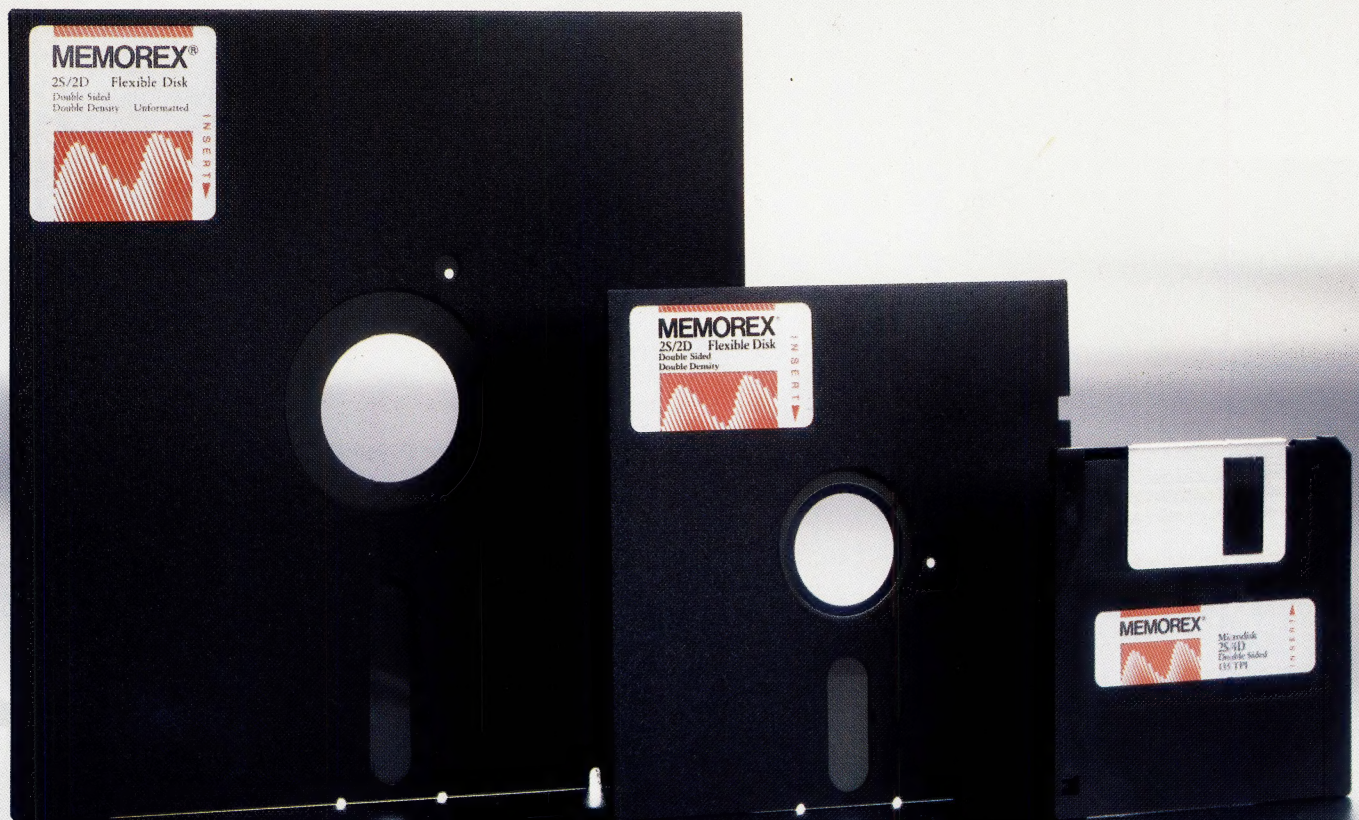
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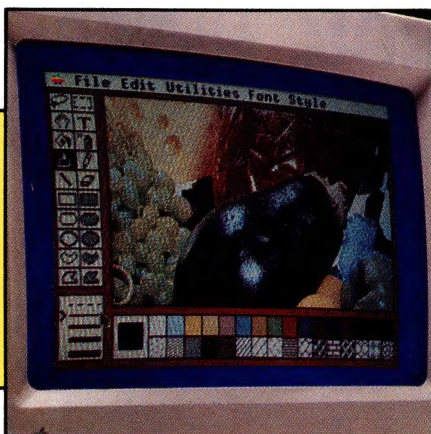
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NEW!! TOOLS FOR C PROGRAMMERS FROM HI-TECH SOFTWARE

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The HI—TECH C Compiler is an all-Australian high-performance C compiler for the Z80 and 8086/8088 processors. Now in use at thousands of sites in Australia and overseas, it combines an excellent user interface and diagnostic messages with smaller, faster generated code than any other compiler. It runs on CP/M-80, PC-DOS, MS-DOS, CP/M-86 and Concurrent CP/M. It allows for the generation of ROM based code and comes with a macro assembler, linker and librarian. The 8086 compiler supports large and small memory models and the 8087 maths co-processor. A cross compiler running under MS-DOS and producing code for the Z80 is also available.

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YOUR COMPUTER

is published monthly by

The Federal Publishing Co Pty Ltd,

Printed by Hannanprint,

140 Bourke Rd, Alexandria 2015.

Distributed Nationally by

Magazine Promotions Pty Ltd.

Registered for posting as

Publication No. NBP4384.

See 'Public Domain' section for information on copyright, contributions, reader services and subscriptions.

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ISSN 0725-3931.



Sales Tax on Software

The recent move by the Treasurer, Paul Keating, to apply sales tax to software has caused considerable resentment within the personal computer industry, as well as with consumers, who will ultimately have to bear the brunt of this tax.

In his budget speech, Keating gave the impression that he was closing a loophole with the imposition of this tax, and that the software industry had somehow been evading a legitimate tax. This slight, in particular, angered purchasers who have had to cope with arbitrary applications of duty and sales tax by customs officers in the past and who have rightly taken the view that while duty and sales tax might be applicable to floppy disk media they were certainly not payable on the software contained within the media.

Currently, the main thrust of the debate seems to centre on whether software is a manufactured product or a service. Certainly, if one wishes to see sales tax removed, it is more expedient to argue that it is a service; however, this argument does not stand up well to scrutiny.

If a software package is sold once, the one purchaser receives the entire benefits of the developer's efforts and in this sense the developer has performed a service. However, if a piece of software is duplicated and sold, then the costs associated with each sale are those of reproducing the software and its documentation, rather than repeating the costs of developing the software again — as would be the case in a true service.

Nonetheless, it is true that a portion of the cost associated with each copy of a software product is allocated to support, maintenance, supplying upgrades either free of charge or at a nominal fee and other activities which take the form of a service.

If one accepts the general principle, which the government appears to be applying, that manufactured goods should attract sales tax while services should not, one would have to conclude that the fairest approach would be a complex one of taxing software at a lower rate than most products — exactly what the rate should be depends upon the pricing and cost structure which software distributors work on.

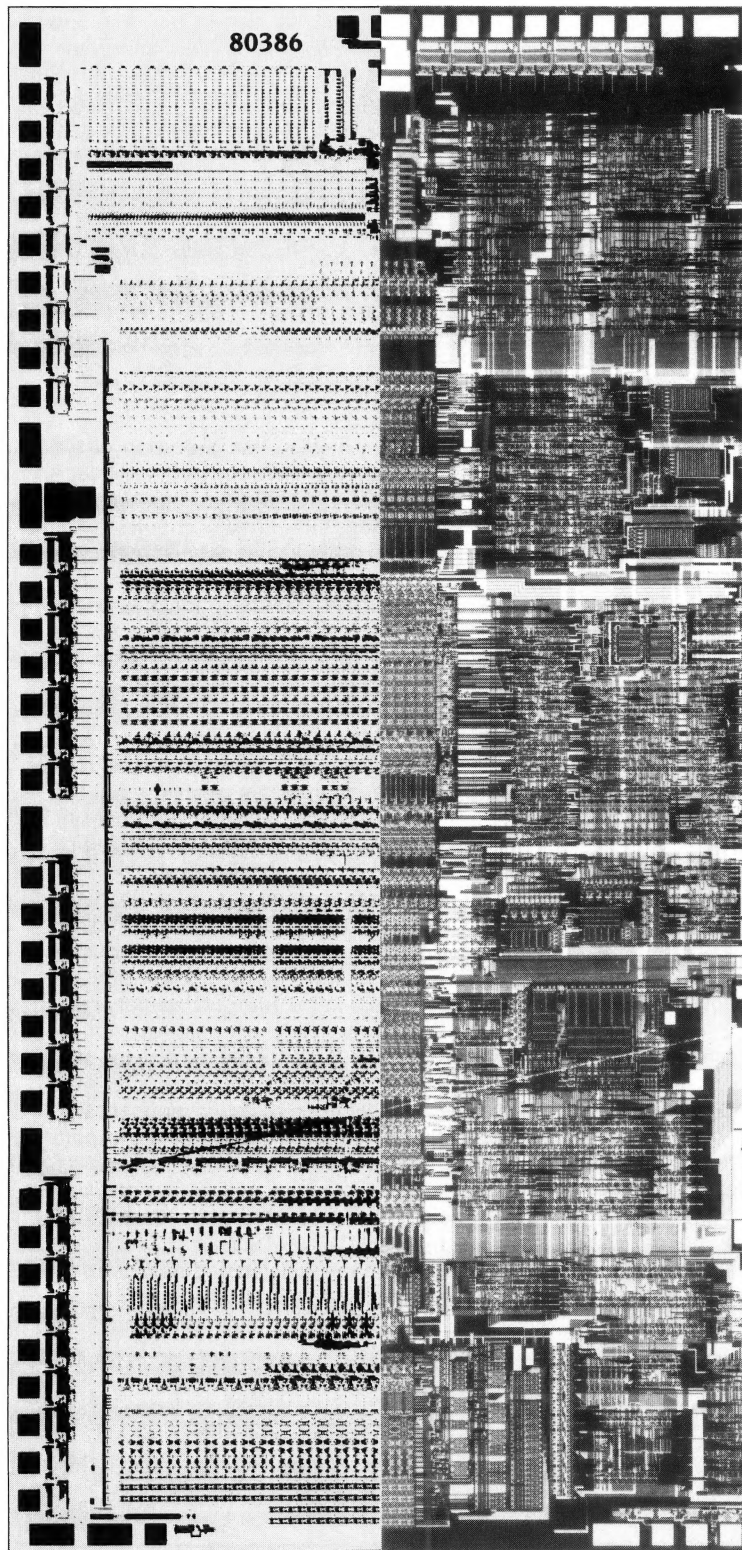
This is difficult to do — in fact, well nigh impossible.

A number of other arguments suggest themselves: that increased sales tax will reduce sales and lead to redundancies in the industry as well as the failure of fledgling software houses who could in the future be valuable export dollar earners for Australia; that businesses who could computerise to increase efficiency and productivity will now not do so; that decreased sales will reduce government income through reduced collection of import duties.

Suggestions that software is in some way different from other products are unlikely to cut much ice with the Treasurer. These are tough times, and the software industry is going to have to tighten its belt along with everyone else.

LES BELL

CHIP STAKE WINNER!



COMPAQ COMPUTER CORPORATION has raced across the finishing line with the first of a new generation of PCs based on the Intel 80386 chip, and life for desktops will never be quite the same.

The new machines based on this powerful chip are going to be more like the mainframes and minis of yesterday — but not, of course, in terms of footprint.

The Compaq release came in the wake of a positive plethora of PC launchings. DEC's VAXmate, Data General's Dasher/286, Sperry's PC/MicroIT and new versions of the Apple Macintosh might all have seemed a bit of a yawn in the light of the Compaq unveiling, if it weren't for some distinctive features built into each one of them.

The VAXmate, in particular, is technology for corporate networking, bridging the gap between VMS and MS-DOS with smart communications and reinforcing DEC's position as a clever technical operator which knows it must offer its users a flow of products that allow smooth upgrades and neat connections.

In the meantime, if you need lots of memory and very fast processing power, and if you want to do multi-tasking, you will be looking forward to the new generation of 80386-based PCs.

Microsoft says it will offer an extension of MS-DOS, which will allow users to divide 16 Mbytes of memory into 1 Mbyte sections, to create a true multi-tasking environment on the new machine.

DEC says it does not want to introduce a 80386-based machine until IBM does — because it wants to know what the standards will be. But IBM seems unlikely to move into the 80386 ranks until well into 1987.

In the meantime, IBM is fighting back in the clone war, with a new XT upgrade, the model 286. As the name implies, this machine is based on the same chip used in the AT. It is selling in the United States for just under \$US4000, which includes 640 Kbytes of RAM, a 1.2 Mbyte 13 cm floppy drive and a 20 Mbyte hard disk.

Analysts in the United States see the release as merely a stop-gap operation on the part of IBM, until it's ready to launch a 80386-based system.

IBM also recently cut the price of the PC AT to its United States dealers, for the second time in two months.

WANNA DRIVE A FERRANTI?

Ferranti is also making a play for a stake in the local PC market. The British company, best known for its strength in defence circles, has come in with two powerful machines, an AT (see elsewhere in this issue) and the Cruise (an XT clone).

The Technology Centre, based in Sydney, is marketing the Ferranti machines and Honeywell is providing nationwide support through 40 service centres.

Not that Ferranti is new to PCs — it's been selling them in the UK and Europe for years. It remains to be seen whether this late entry into the frenetic PC arena can convince the market it has something to offer over and above the rest of the pack.

Many people got their first glimpse of the powerful Ferranti machines at the Business Expo in Sydney. Shows must still have some value — managing director of the Technology Centre, Tom Rosser, says he has since been swamped with serious inquiries and has started to ship gear.

NETWORKING, MULTI-USER HPS

HP has been busy in the United States, replacing its HP 260 small business computers, which were launched early last year, with Series 30 and Series 40 computers, which fit into networked multi-user systems.

The Series 30 can handle four users, and the Series 40 up to fifteen, effectively replacing HP's models 15, 20, 24, and 55. The new 260s are also smaller, and their processors faster.

In the United States, the entry-level Series 30 will sell for \$US7825 — compared with the HP 260 model 15 which sold for more than \$US10,000.

A basic Series 30 computer comes with 512 Kbytes of RAM, a 20 Mbyte hard disk and two serial ports. The entry-level Series 40 (\$US17,550) includes 1 Mbyte of RAM, a 4 Mbyte hard disk, a tape back-up unit and an HP terminal.

ME-TOO AMSTRAD

In the UK, Alan Sugar recently launched his new Amstrad

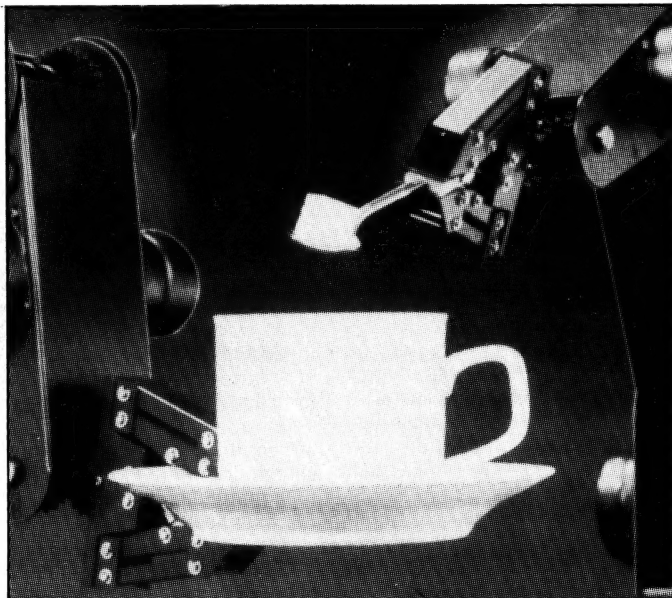
PC1512 — an IBM-compatible business computer. You should also have seen it in Australia by now (it was scheduled for release in October), going under the name Airo. The distributor here is Mitsubishi Electric AWA, which is selling the Airo as a complete package, including the 512 Kbyte computer with dual 360 Kbyte floppy disk drives, a two-button mouse and a colour monitor.

Microsoft and Digital Research are supplying software goodies for this new machine, an indication that they think it will sell. Digital Research has the graphics system GEM on board, and has also launched four new programs for the system — an unusual compliment for Amstrad.

In Britain the PC1512 is being viewed by the networking companies as a cheap workstation which can be linked into vast computing chains, and the software suppliers are happy to have another means of getting a toe in the small-business door.

ROBOTS BOT OUT

The robotics industry, once considered likely to enjoy a meteoric rise in popularity, is experiencing a flattening out in sales across the world. In the United States the industry is expected to decline at least 20 per cent from



1986 levels next year. Cutbacks by the car industry centred around Detroit are seen as a major factor in the decline.

Several robotics companies have already been laying off workers, and are said to be watching as business gradually dries up.

In contrast, revenues in the United States robotics industry grew an estimated 51 per cent in 1985, compared with 1984 sales.

A NEW NAME FOR RSI

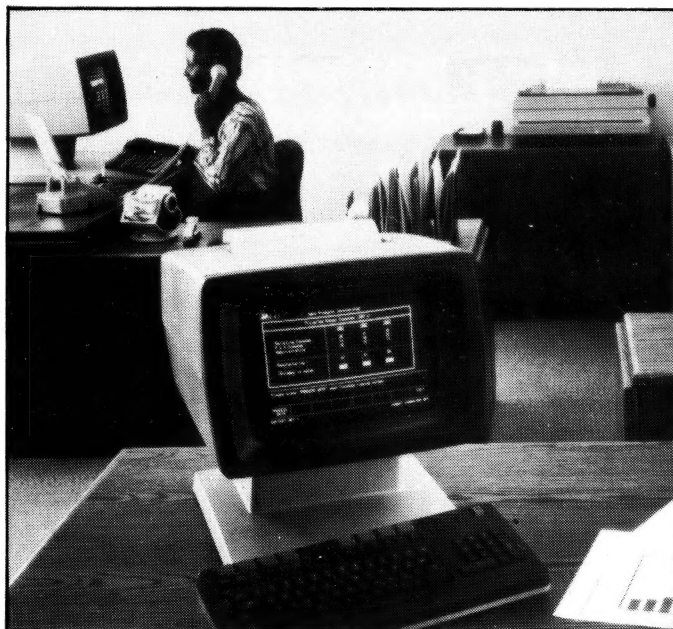
Doctors want to change the name RSI. They say it causes confusion in the treatment of what are two major groups of conditions that cause pain in the upper limbs of the body.

The Royal Australasian college of Physicians suggests such conditions be referred to with medical terms such as epicondylitis, carpal tunnel syndrome or tenosynovitis. Where no clinical signs of abnormality exist, they should be referred to as regional pain syndrome, the College says.

The executive director of the Australian Information Industry Association, Bob Mounic, says his association agrees. A change of name would help avoid confusion and ensure this latter class of conditions is properly treated as a pain problem, rather than as an injury.

"In the light of the Royal Australasian College of Physicians' statement, Worksafe Australia, which is developing a Model Code of Practice for RSI Prevention and Management, should recognise the importance of using appropriate nomenclature in dealing with these problems," Mounic says.

AIIA also believes psycho-social factors should be recognised as one of a number of possible elements contributing to these-



disorders. Mounic quoted doctors who said patients who thought they were suffering from RSI, but were diagnosed otherwise, improved greatly.

AUSTRALIAN PCBS SHANGHAIED

Australian printed circuit board manufacturer, Printronics, has won a second major contract to design, build and supply a PCB factory in China. Printronics has already built a factory for the Chinese, in Chengdu, which opened in September. As with the first contract, this latest deal was won in competition with American and West German companies.

Work on the second multi-million dollar project has already begun on a site in Shanghai, and is due to be complete by December 1987. The Shanghai plant, built for the Shanghai Twentieth Radio Factory, will manufacture

double-sided and multi-layer boards, and will employ around 120 people.

Printronics designs the factories, helps choose the equipment and provides technical advice. The company's assistant manager on the China project, John Cerini, says the equipment is bought from around the world, including Australia.

The contract includes the training of 22 Chinese technicians, who will arrive in Australia in November to commence work at Printronics' Gladesville plant in Sydney.

Printronics will participate on an equity basis as a minority shareholder in the Shanghai factory, through the company which owns and will operate it.

The PCBs manufactured in China will mainly be used in computers, and communications and medical equipment.

Printronics has factories in Sydney and Melbourne and em-

ploys about 200 people. It supplies the local market, as well as exporting to various countries including Britain and the United States.

BEAT-THE-BUZZER MAINFRAMES

IBM has announced it will ship its new mainframe computer, the model 400, a year ahead of schedule. The model 400 is an upgraded version of the Sierra 3090, launched last year. It includes four main processors which can work simultaneously.

The company says it is able to release the 400 earlier than expected because it completed product testing early.

MYER-OH-MY

Myer Computer and Business Centres has bought up the micro retail operations of Grace Bros in Sydney's city store. It will be-

come part of the three-year-old Myer national network.

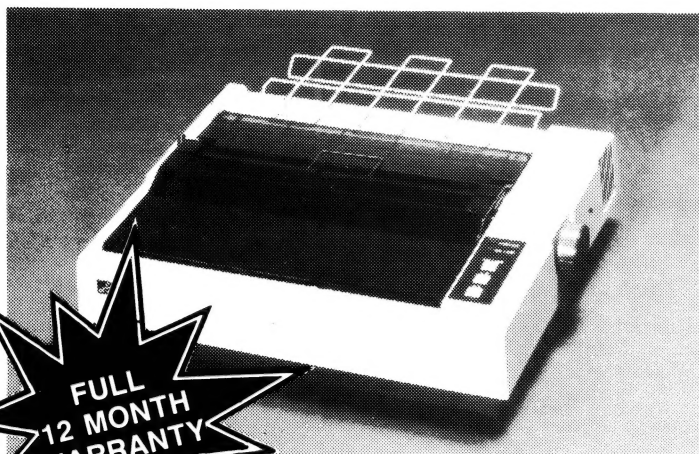
The centres sell IBM, Olivetti and Compaq Personal computers, as well as peripherals and business software.

ASHTON-TATE CONSOLIDATES

Ashton-Tate has appointed Imagineering the sole distributor and the centre of product support for the dBase family of products, while Arcom Pacific, previously co-distributor of dBase, will continue as the sole distributor and support centre for Framework II, an integrated business package.

Keith Van Klink, managing director of Ashton-Tate, said "We felt that the support and marketing of our products needed to be consolidated to provide a comprehensive service to users. We expect our new distribution to provide the best service to dBase and Framework II customers." □

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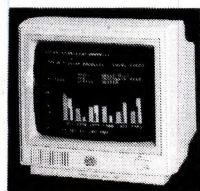
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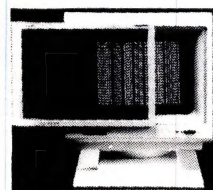
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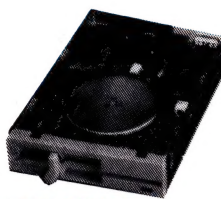
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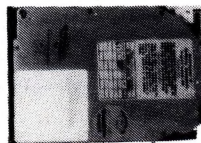
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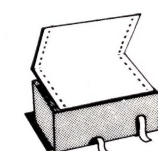


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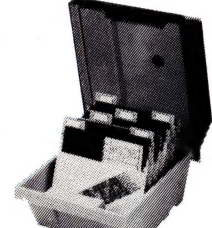
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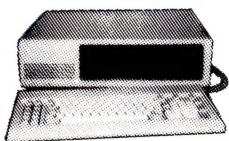
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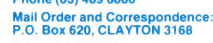


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The more powerful a computer, the more it seems to be deskbound.

Not so with the new Microbee/Mitac Portable PC.

Unlike most MS-DOS computers, you don't need a physique like Charles Atlas to move it from one place to the other.

It weighs in at barely 4.9 kilos.

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The keyboard and 5¼" disk drive are ingeniously incorporated into one unit, with up to 640K of RAM.

So, whenever you need to take your Microbee/Mitac Portable PC somewhere, all you need is a free hand.

IT'S COMPATIBLE
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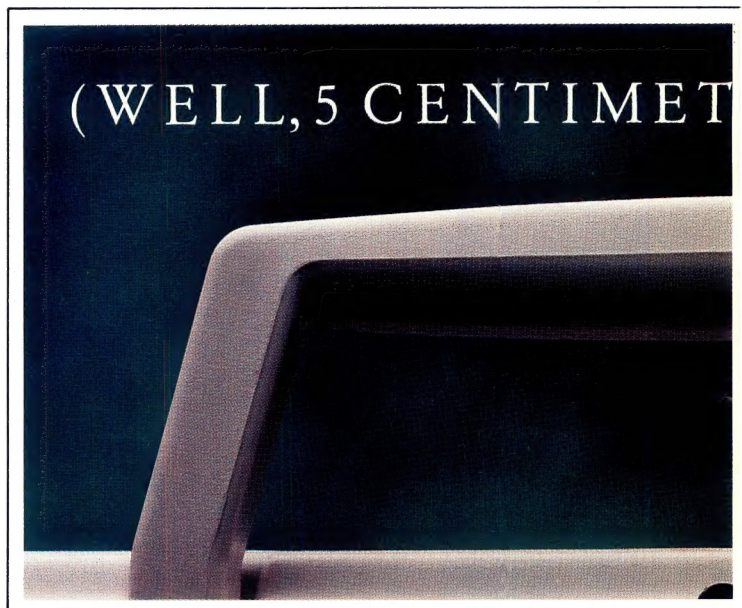
This new computer opens out to Microbee users the range of IBM[†] PC compatible software.

The Portable PC uses the internationally accepted Phoenix BIOS.

So, unlike some compatibles, this

one is truly compatible.

It also runs on the 3.1 version of MS-DOS, with all the latest additions and enhancements, plus provisions for networking.



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OF COURSE.

The inbuilt floppy drive can store 360K bytes per diskette.

If that's not enough, however, an optional second 360K byte floppy drive can plug straight into the rear of the case.

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THE NEW MICROBEE STICKS OUT A MILE.

disk-copying.

It also enables you to run large programmes which require access to expansive data files.

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If you already own a Microbee green or amber monochrome monitor, you'll be pleased to hear that it will plug straight in.

But if you desire something a little more impressive, our new computer

has a colour graphics adaptor built in as standard.

STANDARD ITEMS AND PERIPHERALS.

The Microbee/Mitac Portable PC also includes 2 serial communication ports (not just the one) plus a parallel printer port as standard.

Other standard features include a real-time clock and calendar, with a battery pack.

You'll also find that it's compatible with the range of Microbee peripherals.

So, no matter what use you have for a personal computer, the new Microbee/Mitac Portable PC can (dare we say it) handle it.



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DOS 2.11 or higher
360K bytes memory

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Quick Reference Guide PL/PC™

Document Highlighting and Notation

Bold Items which must be typed in exactly as shown.
Underline Parameters, substitute the underlined item with the appropriate value.
[...] Optional item.
{...} Select one item.
... Zero or more of the previous item.

Special Symbols

~ Negative constant prefix.
@ Imaginary part indicator.
\$ Statement and expression separator.
! Character constant delimiter.
" String constant delimiter.
[k] Axis-specifier, the last coordinate is used if the axis-specifier is omitted.

Basic Data Types

Numeric (bit, pel, nibble, byte, Integer, long, real and complex), character and string.

Maximum Array Rank

127 dimensions.

Maximum Array Size

Each ordinary variable must use less than 65518 bytes of memory. File variable size is limited by available disk storage.

Workspace Size

Limited by available RAM.

Expressions

Left to right evaluation. Unary operators and indexing have the highest priority.

expr1?expr2:expr3
Conditional expression, returns **expr2** if **expr1** is true, otherwise return **expr3**.

{expr1:expr2 ...}
Output list.

expression:field_width[:decimal_places:type]
expression:type
Formatted print. Type 'b', 'o' and 'x' for binary, octal and hexadecimal output, respectively.

Scalar Unary Operators

+y Conjugate of y
-y Negation of y
~y Signum of y
%y Reciprocal of y
^y Exponential of y
log y Natural logarithm of y

floor y Floor of y
ceiling y Ceiling of y
ly Magnitude of y
pl y Pi times y
ly Factorial of y
rand y Random number from 0 to y-1
not y Logical not of y
erf y Error function of y
sin y Trigonometric operators
cos y
tan y
asin y
acos y
atan y
sinh y
cosh y
tanh y
asinh y
acosh y
atanh y
real y
imag y
lsqrt y

Inverse trigonometric operators

Hyperbolic operators

Inverse hyperbolic operators

Real part of y

Imaginary part of y

Integer square root of integer y

Scalar Binary Operators

+y Sum of x and y
x-y Difference of x and y
x*y Product of x and y
x/y Quotient of x by y
x idiv y Integer division of integer x by integer y
x^y x to the power of y
x log y Logarithm of y in base x
x min y Smaller of x and y
x max y Larger of x and y
xly Remainder of x/y
xly Number of combinations of y things taken x at a time, without repetition.
Bessel operators
x ln y
x yn y
x atan2 y Four-quadrant arc tangent of x/y
x lsin y x*sin(y), y is in degrees
x lcos y x*cos(y), y is in degrees

Comparison Operators

x<y x less than y
x<=y x less than or equal to y
x>y x greater than y
x>=y x greater than or equal to y
x==y x equal to y
x<>y x not equal to y

Bit-wise Operators

x and y Both x and y are true
x or y Either x or y is true
x xor y x and y are different
x<<y x shifted left by y bit position
x>>y x shifted right by y bit position
bitnot y Bit-wise not of y

Composite Operators

op[k]ly Reduction of y along the kth coordinate
op[k]ly Scan of y along the kth coordinate
x opl op2 y Inner product of x and y

Subroutine Declaration

procedure name(parameters) or
operator name(right_parameter) or
operator name(left_parameter right_parameter) or
function name(parameters) [forward]
[var x y z ...]
[static a b c ...]
[subroutine declarations]
begin
statement list
end

Statement list

statement [; statement list] -
for index = first_value [to/ownto] last_value
[step size] do
statement list
end

while boolean_expression do
statement list
end

repeat
statement list
until boolean_expression

loop
statement list
end

break

continue

if boolean_expression then
statement list
elseif boolean_expression then
statement list
else
statement list
end

case expression of
value constant1:
value constant1:
statement list
value constant2:
statement list
else
statement list
end

return [expression]

assert assertion_level : boolean_expression

variable = expression

expression

x outer.op y Outer product of x and y
Where opl, op2 and op represents any binary operator.

Structuring Operators

j[k]ly Ravel of y along the kth coordinate
reverse[k] y Reversal of the kth coordinate of x
transpose y Transpose of y
x[k]ly Join x and y along the kth coordinate
x rotate[k] y Shift vectors along the kth coordinate of y by x
x transpose y Interchange coordinates of y according to x
x dim y Reshape y to dimensions x

Selection Operators

x take x Take the first (last) x elements of y when x is positive (negative)
x drop y Drop the first (last) x elements of y when x is positive (negative)
x[k]ly Logical compression along the kth coordinate of y
x[k]ly Logical expansion along the kth coordinate of y
x[y] Array indexing/selection
range y Minimum and maximum of y

Generating Operators

index x y z Generate integers x to y-1 in step of z
index1 y Generate integers 1 to y
gradeup[k] Indices of y sorted in ascending order along the kth coordinate
gradedown[k] Indices of y sorted in descending order along the kth coordinate
x index y First index of element in vector y whose value is equal to x
x in y Membership of x in y
x shape y Shape of y
x rand y x integers selected randomly without replacement from 0 to y-1

Evaluation Operators

eval y Evaluates character string y
x hase y Value of y evaluated in number system x
x rep y Representation of y in number system x
mdiv y Matrix inverse of y
x mdiv y Matrix division of x by y
ft y Fast Fourier Transform of y

Data Conversion Operators

ord y Converts y to numeric
char y Converts y to character
string y Converts y to string

Graphics

circle(x0,x0,radius,data) Draw circles
clrscr Clears graphics screen
conic(x0,y0,i,k,lm,s;data) Draw conic sections
fill(x0,y0,x1,x1,data)

Fill rectangular areas
i = getimage(y0,x0,y1,x1) Gets image from screen
graphwindow = top,left,bottom,right Graphics window
label(y0,x0,data) Writes text to graphic screen
line(y0,x0,y1,x1,data) Draw lines
paint(y0,x0,data) Fill arbitrary areas
palette = background,foreground Color palette
point(x0,y0,data) Plot points
polygon(y0,x0,data) Draws continuous line
putimage(y0,x0,data) Puts image on screen
screen = x Screen mode

Turtle Graphics

angle = x Incremental size of direction in move command
delay = x Delay between move
move(direction,distance) Moves turtle distance pixels in direction
pen = x Pen up or down
position = row,column Position of turtle
turtle = x Display/Non-display of turtle

Screen

clr Clears text screen
color = x Color data
cursor = column,row Cursor position
digits = x Significant digits to be printed
eol Erases to end of line
eol Erases to end of screen
delchar Deletes character
delline Deletes line
inschar Inserts character
insline Inserts line
output = x Creates history file
page = x Page size
window = top,left,bottom,right Text window

Keyboard

i = ask string Gets value from keyboard
i = getline string Gets a line from keyboard
i = lnkey Gets a key stroke from keyboard
i = keypressed Checks if key is pressed

Direct Access to Files, Memory and Ports

i = file(type:shape:name:mode) Creates data structure to access file. Mode ('r', 'w' and 'n' for read only, read-write and new, respectively)
i = memory(type:shape:address) Creates data structure to access absolute address
i = lnb port Inputs byte from port

i = lnb port Inputs word from port
outh(port:value) Outputs byte value to port
outw(port:value) Outputs word value to port
sound(frequency:duration) Sounds speaker with frequency for duration tick

Workspace Management

clear Clears the workspace
copy work_space [objects ...] Copy objects from work_space
del work_spaces Delete work_spaces
dos dos command Executes dos command
edit [object] Edits object
erase objects Erase objects
fns [subroutine] List subroutine headers or body of subroutine
i = free input source file Inputs program from source file
keep Saves current workspace and exits to system
latent = x Latent expression
lib [directory] List workspaces in directory
load work_space Loads in work_space [objects ...]
pcopy work_space Protected copy of objects from work_space
save [work_space] Saves current workspace to work_space
vars [x] List variables in workspace
sysvar List system variables
system Exits to system
wsid = x Name of current workspace

System Variables

assertlevel = x Assertion level
autoparagraph = x Auto-paragraphing on/off
branch = x Complex number branch
date = year.month.day Current date
fuzz = x Comparison tolerance
seed = x Seed of random number generator
time = hour.minute.second.hundredth of second Time of day

Debugging

trace objects Enable tracing of objects
notice objects Disable tracing of objects
stop objects Enable stopping of objects
nostop objects Disable stopping of objects
next Single stepping
profiler = x Enables/disables profiling
timer = x Enables/disables timing
resume Resumes execution
List suspended subroutines
Get the xth item from the operand stack
Exits from last suspended subroutine
=>

THE \$254,000 QUESTION

A good deal of the important microcomputer news emanating from the United States recently concerns Lotus Development Corporation, the Cambridge, Massachusetts-based vendor of the phenomenally successful 1-2-3 and Symphony.

First, in a legal case that's being watched with some interest in the United States software industry — and which should serve as a potent reminder for users of any software, anywhere in the world — a Florida construction contractor has charged that Symphony is a defective product that caused the contractor to lose money. It is suing the company to recover the \$254,000 it claims it lost as a result of the product's defect.

The contractor, John A Cummings Incorporated, used Symphony in preparing a \$3 million

bid. At some point after the company won the bid, it discovered that the \$254,000 it had budgeted for administrative and overhead expenses, and which it thought had been entered properly into a Symphony spreadsheet, was in fact not properly entered. Simplified somewhat, the company's claim is that the fact that the item appeared on the CRT, but was not actually part of its model, represents a "latent defect." Under United States law, the company can sue, and, if it proves its case, recover damages.

Of course, Lotus, like virtually all United States software firms, includes an 'as is' warranty in its packaging. The warranty, which is implicitly binding on users, states that the manufacturer offers no warranty on the product, beyond the fact that the disk is not defective, and that the manufacturer is not responsible for errors or damage arising from any

use of its product.

Cummings claims the warranty does not cover its case, and the suit is currently scheduled to be tried early next year. However, if it actually gets to trial, Lotus is sure to point out that (a) the Cummings controller who actually prepared the model was a neophyte in its use, (b) the \$254,000 item in question was added after everything else in the model had been entered, and the addition was probably made incorrectly, and (c) the model in question was never tested against known data.

At this point, it would probably be overstating the case to say that United States software vendors are eagerly awaiting the outcome. A more accurate statement would be that there is curiosity here over how it turns out. After all, most vendors would probably argue, software is an inherently risky business ...

In any event, this case should

send a warning to everyone: in using any software, first make sure it appears to operate correctly. Make sure, for instance, that it does not gobble up files. And, when a product can be tested — as, for example, by running a case of known results on any modelling software — always do it!

SMALL BYTES

■ IBM and Carnegie Mellon University (Pittsburgh, Pennsylvania) have announced a joint project in AI.

■ Tandy Corporation has announced some IBM PC compatibles, and Wang Laboratories announced its laptop would run MS-DOS.

■ Compuserve, the United States information utility, will start a SIG (special interest group) in desktop publishing. □

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- CP1 GAMES.** Menu-driven, compiled games, including an excellent one that prints bio-rhythm charts, a clever horse race, and a space trader programme for the wheelers and dealers.
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- CP9 TURBO PASCAL GAMES.** Includes CH, a game similar to go-moko. Try to place markers before the computer prints a pattern. DICE for those with a gambling streak, one of the best LUNAR LANDER games around, a word guessing game which tells you how many characters were correct and in right position, plus a typing copy game to match words on screen.
- CP21 UTILITIES.** A whole heap of useful programmes to catalogue your files, arrange the directory display, make emergency alterations to the disc, allow printing and computing at same time, count words, print the screen, copy better, erase, unerase, delete, make batch commands, etc.
- CP28 UTILITIES.** A super collection of some of the best utilities available, such as NEWSWEEP, NULU (file library), SUPER-ZAP and VDO (edit).
- CP31 PERSONAL MANAGEMENT.** HANDY is an integrated collection of utilities for keeping track of appointments, planning, listing tasks, goals and reminders, planning action, notebook, phonelist, and making decisions.
- CP32 DISK DOCTOR UTILITIES.** Contains two major disc edit programmes written in Turbo Pascal. Compiled for immediate use. Source code provided. Probe will view and edit sectors, find bad sectors, copy blocks to a new location, and search for text strings. Works on hard disks, ram disks and floppies. Rescue lets you search memory for text that you've written — and lost when the computer crashed.
- CP42 TYPING TUTOR.** An easy to use, menu-driven programme.
- CP43 TEXT EDITOR.** This is Express V1.01, a full-screen text editor which also allows macros to reduce tedious operations to a single stroke. Formatting facilities on the disk will do page numbering, centering, justification, superscripts, subscripts, special fonts, and more.
- CP63 GRAPHICS — DRAWING.** Allows you to edit, rotate, merge, etc. any image you draw on the screen. Is compiled and set up for 1984 Kaypros but the Turbo Pascal source code is provided if you wish to adapt it.
- CP84 TURBO PASCAL UTILITIES.** Enhance your programming with listing, sorting, printing, auto-menu and mathematical functions, etc.
- CP85 TURBO PASCAL SCREEN GENERATOR.** Simplifies development of screens for menus, data, forms, etc. Concentrate on presentation rather than programming.
- CP101 COMMUNICATIONS. TURBO PASCAL BULLETIN BOARD.** A complete bulletin board package that has been highly praised by others.
- CP102 COMMUNICATIONS. MDM730.** A popular and widely used system. Easily adapted to different machines. Source code and extensive documentation is included. An Apple/CPM version is also available.
- CP141+ DBASEII APPLICATIONS.** A powerful collection of 5 discs with fully developed applications packages, programme extensions and algorithms. Includes super mail-management, inventory control, phone tracking, budgetting, graph-making facilities, patches, checking for duplicate entries, menu creation, and many more. \$50 the set instead of \$75.
- CP203 EDUCATION — FOREIGN VOCABULARY BUILDER.** Teaches a foreign language vocabulary. Can be used to build lessons in various languages. Simple lessons in french are included. Compiled in Turbo Pascal, with source code provided.
- CP501+ MICROBEE SELECTION.** A set of three discs of utilities and games that have been tested on the Microbee. Dozens of games, including Adventure, many with source code. \$30 for 3 discs instead of \$45.

MACINTOSH

Each Macintosh Disk is \$20.

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- ZMC1 GAMES.** A splendid collection which includes Mounds, Starburst, Delek, Nerd, Mastermind and more.
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- ZMC61 GRAPHICS.** Macpaintings, including Migrette, Spades, Castle, Dreams, Eye, Garage, Horse, Keyboard, Set Design, Sputnik, Dinosaur. See how it works.
- ZMC62 NAUGHTY GRAPHICS.** Girlie-type programmes for those who don't blush easily.
- ZMC63 GRAPHICS — ICON LIBRARY.** A resource editor with 270 icons to improve your illustrations.
- ZMC64 GRAPHICS — 33 NEW FONTS.** A bigger library gives you more power, more control, better presentation.
- ZMC65 GRAPHICS — VIDEOWORKS DEMO.** Seven movies to watch and edit.
- ZMC66 GRAPHICS — MACPAINT UTILITIES.** Includes slide show, Viewpoint, Patterns.
- ZMC81+ PROGRAMMING LANGUAGE — MODULA 2.** A three disk set of this excellent language. Powerful, easy to use, similar to Pascal and a versatile language that is as suitable for beginners as it is for advanced programmes. Two disks for \$40.
- ZMC82 LANGUAGE — FORTH DISK.** A language that produces very tight coding and gives the author a lot of control in applications. Includes Forthcopy, SoundLab, Toolbox.
- ZMC83 LANGUAGE — PRESENTATION.** Writing programmes is only half the battle. They still have to interface with the user. Here are twelve Start-Up screens to help you improve ease-of-use and presentation.
- ZMC84 LANGUAGE — MBASIC UTILITIES.** Picture, Calendar, Disassembler, Clock, Art, Calculator, Compare, File Printer, Pattern Editor, Set Pointer, Font Display, Sounds, CRStripper, Fancy List, REM Remover, Dvorak Keyboard, MacCopy.
- ZMC101 COMMUNICATIONS.** A brilliant set with Terminal Emulator MACTEP and the outstanding modem programme Red Ryder v. 6.0E.
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- ZMC122 BUSINESS PROGRAMMES.** More Multiplan Templates, and programmes for investors, such as Stock, Options, Bonds. Includes Time Cards, also.
- ZMC201 EDUCATION — MATHS AND GRADING.** Let your computer do the work. Computers also have endless patience and will let you make errors without an angry outburst. So far.
- ZMC202 EDUCATION — MUSIC.** Contains Music works, including 30 songs. If you'd like to compose on the Mac, here are some good illustrations.

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Well, almost free. We don't charge for the public domain software but there is a small service charge of \$15 per disk to cover promotion costs, selection, testing, copying, etc. Disks are available for CP/M, MS-DOS and APPLE. Mail and telephone order only.

The programmes have been carefully selected, tested and documented. They'll run on a wide variety of computers that accept 5¼" disks. We have tried to choose programmes as machine-independent as possible. However we cannot guarantee the suitability of programmes for your particular machine. Wherever possible we include source-code.

MS-DOS programmes are aimed at the IBM-PC and close compatibles. The NEC APC III will often require the software library extension card to be able to execute these programmes. Documentation is included on the disks where required — often it is very extensive. Unfortunately, we are unable to provide telephone tutorials on using the programmes.

MS-DOS disks are formatted for standard MS-DOS 2.11 360K. Testing has been carried out for CP/M disks on a Z80 Kaypro II. About 120 different formats are supported, including Kaypro, Osborne, Tandy, Microbee, Bondwell, Commodore 128, Tele-video and Apple II.

MS/DOS

DISK No.

- M5 SUPER COMPILED GAMES.** Eight arcade games for those with colour graphics adaptor. Very absorbing. Includes Pango, Gold, Pyramid, 3-Demon, etc.
- M8 SELECTED FAMILY FUN GAMES.** A flight simulator, music generator, excellent Pacgirl, space wars, etc.
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- M25 SELECTED UTILITIES.** Dozens of highly useful utilities, with documentation, compiled and ready to go. Includes Autodex (super file manager), Membrain (ramdisk) Squeeze and Unsqueeze, Directory Printer, Calendar, File Finder (great for hard-disk), Keyboard Definer, etc.
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AMERICAN GRAFFITI

BY HOWARD KARTEN

BEFORE YOU GET to the weighty considerations of computer stuff for business, I'd like to share a few thoughts about business stuff for computer users. Some of the business aspects of computer products often get overlooked, or have thus far managed to escape sufficient consideration by us media folk.

Purveyors of computer products do their purveying, of course, in pursuit of a buck. This is entirely honorable, since income is a terrific motivator for us all. But perhaps one reason it's been so easy to overlook profit motives in the past in the computer business is that computer companies themselves have occasionally approached business sloppily.

In some respects, it's fortunate that computer consumers have been spared the 'businesslike approach': we've been exempt from the over-zealous advertising used to hawk products such as hair mousse or strawberry jam. For instance, copywriters have not tried to persuade us that one brand of software is better than another because it's *European style*. What European style software might actually be, is impossible to say, of course. Nevertheless, since this and other key phrases seem to be effective in selling products such as hair colouring, it's undoubtedly only a matter of time before European styling shows up underneath the shrink-wrapping.

Quite a number of computer products can legitimately claim being 'imported' as one of their benefits/attributes; but that's commonplace these days, and since there's little extra cachet to imported software or boards, the advertising copywriters seem to have dropped this one from their standard repertoire of claims.

Similarly, we've been spared the claim, used several years back in peddling products for the laundry processor, of products

that will create 'whiter than white' results. Can you imagine some frenzied copywriter reaching into his bag of clichés and claiming that his client's spreadsheet package "gets data whiter than white" (Come to think of it, this slogan might be used legitimately in hawking colour products such as CRTs and colour printers.)

The folks writing advertising slogans have been known, on occasion, to come up with less-than-perfect slogans, or to unthinkingly transfer a slogan from one product to another. Mercifully, it doesn't seem to have happened too often in the computer business. A modem manufacturer might believe that its products would last a long time before they cease working, but customers might misinterpret the claim "lasts 50 per cent longer" as meaning that the modem would slow down the transfer of information from one computer to another.

And consider the boastful "contains no salt". Most business reports are best taken with several grains of salt, so a word processor advertised as containing no salt would not be terribly useful *unless* the user could add salt 'to taste' to his output — but such a product might produce the kind of 'salty language' that so frequently gets speakers in the soup.

Another way in which computer business has been less-than-fully businesslike is in packaging. Had not a *de facto* packaging standard evolved, we might be treated to software packaged "in the new pump dispenser". Then, presumably, we could uncork only as many computer instructions as we needed to get the job done, making it more economical to run computers. "Just add water and mix" would probably make you think twice about using the product around electricity or disks. And can you imagine how much more difficult it would be to use software if it were packaged in those bomb-

proof, antiseptic cardboard containers used for juice and milk? Since you couldn't just stick a straw through the convenient hole, you'd spend hours just getting the disk out . . .

Increasingly, computer companies have recognized their failings, and responded by hiring more employees with business background. The quintessential example no doubt is John Sculley, former president of that low-tech company, Pepsi Cola. So it may be only a matter of time before the concepts of retail advertising and packaging show up in the computer field. Given the esteem that most practitioners of the advertising craft have for truth and accuracy, perhaps we should all be thankful for the clumsy computer business practices we've seen in the past.

SEND IN THE CLONES

The big news this month is the appearance of some long-awaited IBM-compatible micros in the world powered by the Intel 80286 and 80386 chips.

Compaq Computer Corporation, the Houston-based company whose IBM-compatible has broken many business and sales records, launched its 386-based desktop machines, called the Compaq Deskpro 386 Model 40 and Model 130. According to the company, the two machines will run all the software available today for the IBM PC and PC AT, as well as add-ons and peripheral devices designed for 80286-based machines.

The Compaq Deskpro 386 has an internal 40 megabyte disk drive, six expansion slots, standard one megabyte RAM memory, and a 101-key keyboard. The machines can accommodate a maximum of 14 megabytes of RAM, and up to 130 megabytes of fixed-disk storage. List prices for the Model 40 start at \$US6,500.

At almost the same time, Sperry, currently in the process of merging with United States

computer giant Burroughs, introduced an 80286-based machine, the Sperry PC/Micro IT. Sperry claims this machine is "48 per cent faster than similar systems," and can accommodate up to 1.5 megabytes of storage without an expansion slot. The machine will be built by the American branch of Japanese giant Mitsubishi.

Digital Equipment Corporation also entered the fray with an IBM PC-AT-compatible machine, which can also share software with DEC's VAX line of mainframe (supermini) hardware.

And, to make the picture complete, IBM cut the price of the PC AT, and announced a new, 80286-based XT, replacing the midlevel PC AT. The move seemed to puzzle many users and industry observers, because although the new machine also uses the Intel 80286 chip, and costs \$US1,300 less than the AT, it operates at 6 MHz instead of the AT's 8 MHz, and is therefore slower.

NIBBLES

■ Ashton-Tate has removed copy protection from all its products. The move is generally believed to be aimed, at least in part, at (would-be) large corporate buyers of AT products.

■ School days, school days: micros show up in more training facilities. At the United States Naval Academy (Annapolis), members of the Class of 1990 will each be issued a Zenith Z-248 AT-compatible PC. The midshipmen will pay for their computers out of their salaries over their four-year education, then take their computers with them as they go to their first military assignments. Whether, or how, they will actually apply them to their military jobs is another question entirely . . .

■ Headlands Press, the California-based shareware company which wrote the widely used PC-Talk communications program, will soon have available the newest sanctioned version of the program, said to be especially feature-filled. □

BULLETIN BOARD NEWSFLASH

Believe it or not, for business or for pleasure, more spectacular than ever, the *Your Computer* Bulletin Board is back with Bells on.

Find that hard (disk) to imagine? Well, how else would we be able to share our **50-plus megabytes** of neatly catalogued **public domain software**. Even with our new whizz-bang ever-whirring fixed drive (yes, you heard right) we'll have to rotate all that soft stuff in 10 megabyte batches . . . Then we'll still have room to slap up:

 The regularly updated, cross-referenced, five-year index to *Your Computer* articles.

 Our database of the new products listed in the magazine each month.

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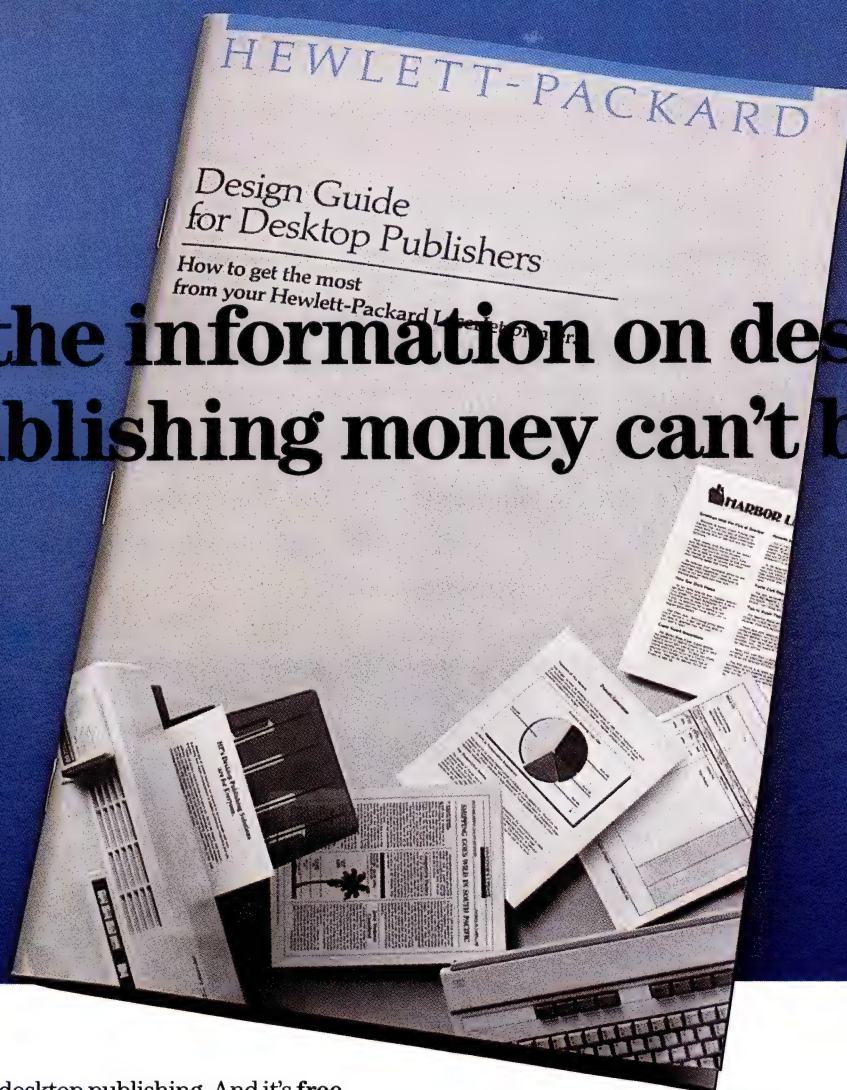
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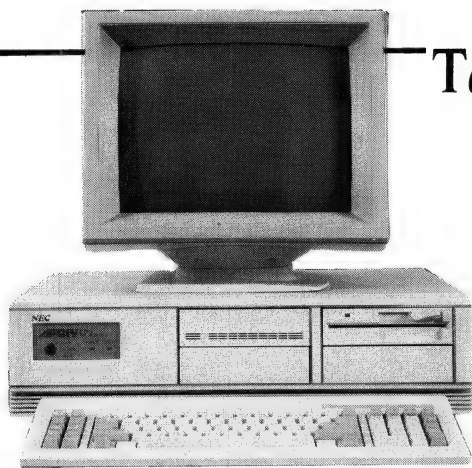
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ATs Take Over – the Earth-Shattering Facts

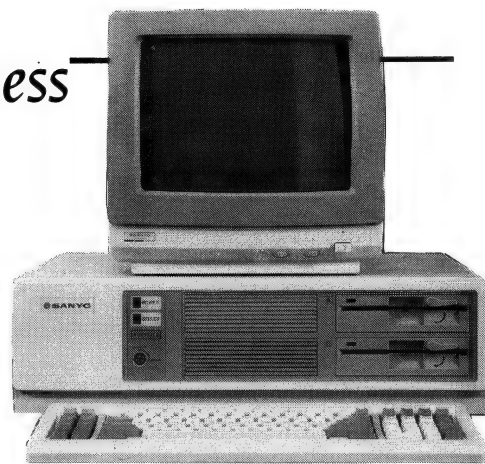
Are we keeping up with the ATs? The trusty stopwatch is looking frazzled, and we're all bent double from packing and unpacking the parade of ten-ton Tessies now piled up around the office. Matt's NEC is out, we've moved heaven and Earth, we've coped with the girl in the red Ferranti, who thought it was all a bit Multi-tech, but as they say at Sanyo ... that's life ... it's Matt's life and he's spending it testing ATs.



Taking Care of Business



The Sanyo MBC 990 — an impressive machine with its own design peculiarities.



NEC's APC IV is a quality machine with useful design touches — a good start to toeing the IBM line.

The locally designed Earth Computer Systems ECS 286, high-powered star of our past AT comparisons, has been convincingly toppled from its top-of-the-performance-chart position — by a new ECS machine.

The Australian company, not content with producing what was clearly the fastest micro available here, has launched a new 12.5 MHz machine which makes *all* the ATs we've tested look pedestrian.

The last ECS ran rings around its imported opposition, with only the high-powered, high-priced ITT Xtra XL coming even close to its figures. The new machine rewrites personal computer performance standards, and moves clear of the pack into a class of its own.

Only the new-wave Compaq 386 will challenge the ECS machine's supremacy when it goes on sale here in November. (See the boxed item in this article and the News section for more details on this 16MHz wonder).

And we have bad news for any manufacturer working on a competitor for the current performance king — Earth Computer Systems says it has a 'high-performance' model on the drawing board. This is a company after our own hearts!

Market UpdATE

Before we look at the latest pack of ATalikes, we should issue a warning related to our performance comparison charts. It's almost a year since we started testing ATs (the first series of tests appeared in the January 1986 *YC Yearbook*), and in a rapidly changing marketplace some of the figures shown in the chart may have been outdated by subsequent releases.

For example, our performance 'standard', the IBM AT, now runs an 8 MHz processor, yet our figures show a 6 MHz machine — as soon as we can test the newer model we will update the chart. Other machines tested may have been replaced by faster units, but until the manufacturers or importers provide a machine for re-test,

we can't update the figures. Unfortunately, some of these people seem to believe we're endowed with a large dose of ESP.

We've added an extra field to our performance comparison chart to help you judge where figures may have been superseded. From now on, the chart will list the issue the machine was first tested. Update figures on more recent models will be easily identified, while we'll usually note the existence of newer models as soon as we know about them.

Sperry is one company to have released a new model since our tests were conducted — just as this issue went to press it launched its latest 286 machine. We'll try to look at it in the next issue.

Osborne's figures, mentioned in a news item last issue, should also be updated in our next batch of AT tests — the company will be up to its second new release by then. For those who missed the news item, we pointed out the machine tested was an early prototype, and the production model is claimed to have significantly better performance than our figures show. A new high-performance version was due for release this month; we hope to report on it soon.

GreAT Design

It is worth noting that we are (thankfully) getting away from slavish cloning — a number of manufacturers are starting to show a little innovation within the framework of the AT design. We've already commented on the 'different' design of the Texas Instruments and Hewlett-Packard machines; this time, the Ferranti PC2860-AT stood out, both for its attractive appearance and some practical design touches.

Its biggest feature, for those of us who are tired of unscrewing and unboxing the AT, is the removable panel on top of the machine, which allows access to the expansion slots without even having to move the monitor. Paradise!

Speaking of sensible design features, let me ask why most manufacturers are still copying IBM's idiotic placement of the keyboard connector at the rear of the machine? They all provide a nice, long, coiled keyboard cable which is almost totally used up in running around the machine to the back. One or two makers (like Compaq and TI) have done the right thing, but it's about time the others followed.

And just in case these anti-designers don't know the best location for it, it's at

the side of the machine, near the front. Similarly, the cable should enter the keyboard from the side (common sense would dictate placing it on the same side, but if we don't point that out we know what will happen) so the keyboard can be pushed up close against the machine when desk space is limited.

The LATEST Contenders

As usual, we're not planning to bore you with too much detail on what are, essentially, very similar machines — 'clones' of the IBM PC AT. We'll simply note any especially interesting or unusual features of each, and then get on with the performance testing.

ECS 286: The new ECS is little different from the machine we tested in our last comparison — except for its big-revving 12.5 MHz engine. It was designed as a high-speed XT rather than an ATalike, to allow for greater PC compatibility, although it has some problems with Softguard-protected software.

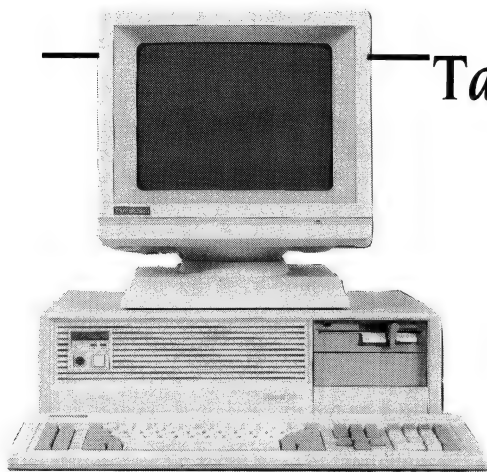
With major software companies like Microsoft and Ashton-Tate setting the trend by dropping copy protection, this speed-induced incompatibility is less likely to be a problem these days.

The ECS is purpose-built for CAD applications, running the high-resolution Enhanced Graphics Adapter, a numeric coprocessor, and a fast 40 Mbyte hard disk. Since our first test of the ECS, we've had a few reports in from owners who seem very happy with their choice (and very proud of its performance!).

Multitech Accel 900: Dick Smith Electronics has had a fair amount of success with the quality-built Taiwanese Multitech PC clones, and the new AT-style machine should continue the trend. It runs a 10 MHz 80286, 512 Kbytes of RAM, and a 20 Mbyte hard disk.

It has a very wide keyboard — wider than the system unit — with the usual AT layout plus a separate pad of function/cursor keys. A power light joins the key indi- ➤

Taking Care of Business



The Multitech Accel 9000 is the latest offering from this Taiwanese manufacturer of quality-built PC clones.

cator lights — the expected position for it on the system unit is taken up by a light which shows when the machine is running at 10 MHz.

Processor speed is software-selectable through a supplied program called, not surprisingly, SPEED.

NEC APC IV: NEC, which so proudly proclaimed its IBM-incompatibility at the launch of the APC III, has been forced to toe the IBM line, and the APC IV is a good starting point.

It is clearly a quality machine, with some useful design touches, such as built-in serial (two) and parallel ports — leaving seven free expansion slots after the insertion of the very-high-resolution video card. Another neat touch is the reset position on the front-panel key lock, which turns this item from a pose feature to a useful device.

The keyboard is one of the few noticeably 'undead' units around, with a nice-clicky (*a la* IBM PC) feel and positive action. Key layout and indicator lights are standard, but an extra-length cord is attached do allow it to do more than just reach the plug at the back.

A switch at the front-left corner of the machine selects between 6 and 8 MHz operation.

Sanyo MBC 990: The Sanyo suffers a little from 'non-westernised' software design — there is a typically Japanese awkwardness to its behaviour in some areas. For example, the MODE command has been extended to allow the alteration of the number of wait states, and in the process the method of operation and syntax of what should be a universal DOS utility has been changed entirely. GWBASIC doesn't want to run properly unless run from the subdirectory it is located in. When you do change speed (by altering wait states) the machine must be re-booted before it will operate at the new setting.

These minor irritations aside, the Sanyo is an impressive machine. It comes with 512 Kbytes of RAM and a 30 Mbyte drive in

a neatly packaged unit.

Ferranti PC2860-AT: Ferranti has been in the computer business since the 1950s. On the local micro scene, its best-known product is the Challenger, the IBM PC-(almost-) compatible cheapie sold by Dick Smith Electronics.

The PC2860-AT is a far heftier box than the Challenger, both in weight and power. The unit tested came with the usual 640 Kbytes of RAM and a 20 Mbyte hard disk. Processor speed is software switchable between 6 MHz and 8 MHz.

Expansion is more limited than some of the other machines tested: once you've inserted a display adapter card, you've only four expansion slots left. Getting at the expansion slots, however, is very easy — all you do is remove the press-release panel from the top of the machine.

Apart from the speed trials, we tested a lot of other software on the machine, and most of it ran okay, with the exception of Pop-Up Deskset, a memory-resident set of utilities. The utilities themselves worked well, but each time we tried to return to DOS, the machine locked up and needed a hardware reset to get going again. The same program worked perfectly when run on the Hypec Lingo AT.

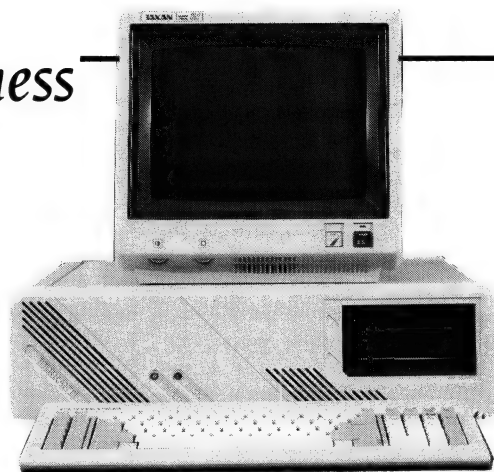
AT Last

Down to performance! We carried a full description of our performance tests in the September issue; we won't repeat that here, but will give a brief outline for those who have missed the earlier episodes of the AT saga.

We ran each of these machines through a series of nine tests designed to give a measure of overall performance in the everyday work situation — claims based on straight processor speed are often decidedly misleading because they take no account of other important factors, such as disk performance. You can see from our "Percentage of IBM" comparison chart that many machines with very high processor ratings drop back when overall performance is measured.

Only three of our tests, BBBMARK (a simple Microsoft BASIC loop), CBSIEVE (the Sieve of Eratosthenes in compiled CBASIC), and the Lotus recalculation are direct measures of processor speed.

The Lotus tests measure the time taken to load, recalculate and save a large (but simple) spreadsheet, while the dBase tests measure the time taken to create a file from calculated fields, index it, and partially delete/pack the file.



Ferranti's PC2860-AT is far heftier in both weight and power than the well-known Challenger.

DOIT measures floppy to hard disk transfer speed, and is used to load the other test software onto the machines to start with.

Five tests are disk intensive — the Lotus load and save, stage two and three of the dBase benchmark, and DOIT — and usually show up some interesting differences between machines. This time around, for example, the Multitech falls down badly on these tests; in some cases it's slower than the old IBM AT. Its excellent processor performance keeps it up with our performance leaders, but it's plain to see a faster hard disk would give it a huge kick along.

■ **BBBMARK:** A straight test of processing power left Dick Smith's Multitech looking good — it ran 5.5 seconds, matching our previous giant-killer, the ITT Xtra XL. But just like last time, along came the local boy, the ECS, to make good. The Multitech is obviously a hot-rod, but it couldn't match the grand-touring ECS at a stunning 3.7 seconds.

NECst up was the APC IV, at a more sedate 6.9 seconds, ahead of the Ferranti at 7.0 and the Sanyo at 7.5.

■ **CBSIEVE:** Another processor-intensive test, and another great result for the Multitech at 2.93 seconds — matched by another blinder from ECS, which ran an incredible 1.75 seconds. The others would have looked good if the Australian hadn't been there to shame them ...

The remaining three were closely matched, with 3.63 seconds from the Sanyo, 3.68 from the NEC, and 3.71 seconds from the Ferranti.

■ **Lotus Load:** The ECS trounced the opposition on this one, recording a time that is almost half the others. It ran 12.4 seconds, while disk speeds equalised the runners-up: The NEC came in second at 22.5, ahead of the Multitech at 22.8, the Sanyo at 23.2 and the Ferranti at 23.5.

The local star spoiled what would have otherwise looked like a close race, but we were enjoying its obvious contempt for

current market standards.

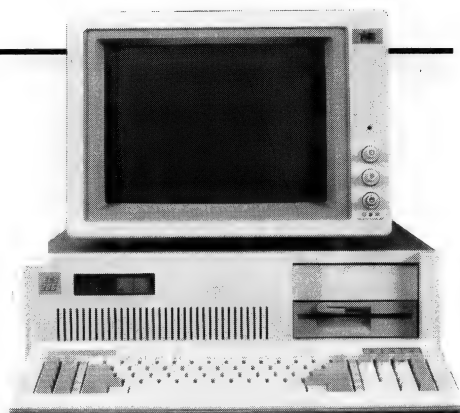
■ **Lotus Recalculate:** Yes, the ECS romped in with a cheeky 3.0 seconds, a staggering 50 per cent better than the powerhouse ITT machine tested in our last round.

As you would expect, the 10 MHz Multitech came in next at 4.5 seconds, well clear of the NEC on 5.5, the Sanyo on 5.9,

and the Ferranti on 6.0.

■ **Lotus Save:** This test is often a great equaliser, with processor speed seeming to play little part in the result at all. Nevertheless, the ECS wins again, although the NEC jumped into the limelight with a 13.0 seconds run compared to its 11.7.

The Sanyo came in next at 15.5, from the Ferranti on 24.2. The Multitech's square



The ECS 286 is purpose-built for CAD applications with the high-resolution Enhanced Graphics Adaptor.

What To Buy?

It's getting tough to decide which AT-like to buy these days — each time we've run a new comparison, we've come up with a faster or cheaper machine which takes our fancy, and this time is no exception. But now there are a number of machines we'd consider before buying, and it's hard to pick a clear winner.

Of this issue's group, we have two favourites.

We're known speedfreaks, so you've probably already guessed that we couldn't resist the stunning performance of the ECS. It's a giant-killer, and at around \$12,000 represents excellent value for those who need minicomputer power on their desktop. In CAD applications I doubt you could find a better combination.

The Multitech appealed to our accountant, who knows his bill wouldn't be paid for another five years if we bought the machines we really wanted. At \$6995 (plus a monitor, ranging from \$300 to \$900), and including the Open Access II inte-

grated package, it's a star performer.

The NEC is a little more expensive at \$10,500, but it is great value considering its equipment levels. It has a fast 40-Mbyte drive, two serial ports, parallel port, 640 Kbytes of RAM and a colour card and colour monitor. Most people don't include these extras when they quote a price.

The Ferranti is another good value unit, with a ready-to-run price of \$7220 including the Perfect Software series, while the Sanyo sells for \$6995 plus a monitor.

Overall? We'd be happy with almost all of the machines we've tested, but would probably end up with a short list that included the ECS, the ITT Xtra XL, and the Archives Micro Five at the top end of the scale. To satisfy our accountant (and reality) we'd have to include the Televideo Telecat, the Multitech and the Hypec Lingo AT.

Our bargain-buy choice is probably still the Televideo, but it's really a coin-tossing job by now.

	BBBMARK	CBSIEVE	LOTUS			dBASE			DOIT	Issue Tested
			Load	Recalc	Save	Stage 1	Stage 2	Stage 3		
ECS 12.5 MHz	3.7	1.75	12.4	3.0	11.7	144	209	228	54.0	November 1986
ITT Xtra XL	5.5	2.65	16.5	4.4	13.0	238	267	298	50.0	September 1986
MicroFive	5.6	2.89	22.0	4.9	12.9	294	258	353	66.2	May 1986
DSE Multitech	5.5	2.93	22.8	4.5	24.4	224	322	359	64.4	November 1986
NEC APC IV	6.9	3.68	22.5	5.5	13.0	280	331	372	42.7	November 1986
Hypec Lingo AT	6.9	3.69	23.0	5.8	13.0	280	326	366	69.0	September 1986
Televideo	6.9	3.70	22.2	5.8	13.5	281	366	403	55.0	September 1986
NCR PC8	7.0	3.70	23.3	6.0	14.0	280	315	351	68.0*	January 1986
Sanyo MDC 990	7.5	3.63	23.2	5.9	15.5	303	378	422	40.5	November 1986
TI Turbo	7.3	3.64	23.4	6.0	14.4	307	391	435	46.0	January 1986
Compaq 8 MHz	6.9	3.69	22.5	5.5	13.8	281	434	476	62.3	January 1986
President AT	6.9	3.56	23.5	6.0	14.1	306	382	425	85.5	May 1986
HP Vectra	6.9	3.69	23.2	5.5	23.0	283	472	514	70.0	May 1986
Sperry PC/IT	6.9	3.71	22.8	5.8	25.1	287	393	573	71.3	May 1986
Ferranti PC2860	7.0	3.71	23.5	6.0	24.2	284	458	501	67.0	November 1986
IBM AT	9.1	4.89	23.8	7.7	23.3	378	408	458	57.0	January 1986



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Taking Care of Business

wheels really showed here, with a disappointing 24.4 seconds.

■ **dBase Benchmark:** I bet you can't guess which machine won here? You can? Oh, well, I bet you can't guess by how much? The ECS blitzed its nearest competitor by a margin of more than 300 seconds — *five minutes!* — on this three-stage test.

On stages two and three, both disk-intensive, it even managed to outperform the 80386-powered Compaq 386. *That* is performance.

The Dick Smith machine took a clear

second place, although a faster disk would have given it a giant boost here. It led the NEC, the Sanyo, and the Ferranti home.

■ **Doit:** As we've seen in earlier tests, floppy performance can really change the picture. The ECS suffered its only defeat here, although its 54-second time put it ahead of most of the 19 machines we've tested so far.

The winner of this one was the Sanyo, with a 40.5-second run, ahead of the NEC (42.7 seconds), the ECS, the Multitech (64.4) and the Ferranti (67 seconds). □

Greased Lightning

BLITZED ONE MONTH, blasted the next — all this speed is making us dizzy.

And now, to cap it off, comes the incredible Compaq 386 — three times as fast as the IBM AT, it's a view of our minicomputer-on-the-desk future.

The Compaq, announced in September for sale here in November, brings the advanced Intel 80386 processor to the popular marketplace six months earlier than we had expected. While many companies prefer to sit and watch what IBM will do next, Compaq has decided to jump in and give the high-end users the power they crave. (For more background information on the release, refer to the News section of this issue.)

The 16 MHz 386 is claimed to be more PC compatible than the AT. Its speed is software-selectable over a wide range through a modified MODE command — it can be set to *common* (the AT's 6 MHz), *fast*, *high*, *auto* (where it adjusts itself to suit the speed of the software or expansion cards) or anywhere on a scale from 1 to 50 (setting it to 3 matches the IBM PC).

It can carry up to 10 Mbytes of memory on the new full 32-bit bus, plus a further 4 Mbytes on the PC- and AT-compatible 8/16-bit bus. ROM, I/O and expansion cards are ac-

cessed from the standard bus.

The Model 40 comes with a megabyte of RAM, a 1.2 Mbyte floppy, a 40 Mbyte hard disk and parallel and serial interfaces for a far from excessive \$14,250. A 130 Mbyte hard disk version costs \$18,950 and, because of the drive speed, runs even faster.

Faster than what? Well, we only had a short time to look at the machine at Compaq's offices, but we managed to run the series of tests we've used on the ATs. It trounced our superstar performer, the 12.5 MHz Earth Computer Systems machine and, when you compare it to the more standard AT-style machines (including the Compaq 286), their efforts start to look almost feeble.

It's a tribute to the local makers that the ECS came as close as it did to the 386 (it even 'won' three of the disk-intensive rounds). If you want a more balanced idea of the Compaq's performance, compare these figures to machines like the IBM AT and the high-powered ITT Xtra XL rather than just looking at the ECS:

Doit, 35.6 seconds; BBEMARK, 3.01 seconds; CBSIEVE, 1.37; Lotus load, 12.2; Lotus recalculate, 2.5; Lotus save, 12.2; dBase stage 1, 123; stage 2, 229; and stage 3, 254 seconds.

We'll take a closer look at the Compaq 386 as soon as we can get one for a full review — in the meantime, we thought you'd enjoy this glimpse of the future... □



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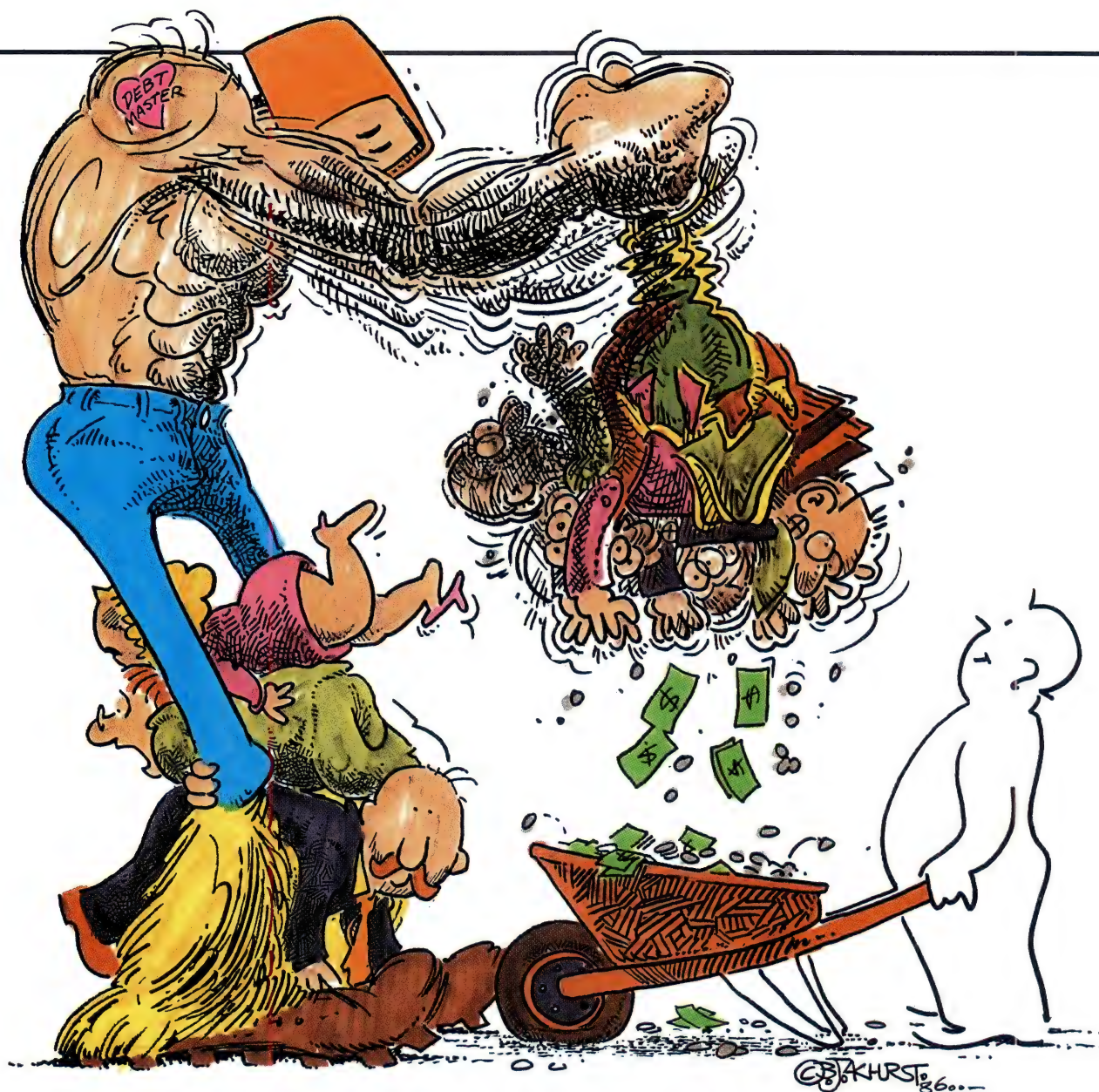
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DEBTMASTER - Part 1

Lindsay Ford, of Dreamcards Software, unveils the first, documented module of his comprehensive debtor management program for business applications. Can you afford not to be running it?

You don't have to be Bob Ansett to know that a critical factor in business success is having an adequate cashflow. This is where many small businesses are sadly lacking — customers string out payment of accounts for months, while owners grumble about the economy and that they'll have to miss out on their annual holidays. This common scenario has sent many businesses to the wall, and even more struggle

by from year to year, with the owners earning less than the basic wage.

Maintaining adequate control over debtors is the key, but it can be a tedious process. If you've spent a long, hard day behind the wheel of a truck, digging a trench or sitting in an office, the last thing you need is to return home at night to work on a pile of invoices. It was with this in mind that I wrote Debtmaster for my own business, and after several months

I'm delighted with the results. The boredom of routinely checking my unpaid bills file is a thing of the past, and my debtors have been reduced by around 40 per cent — this year I will be taking a holiday!

As you've no doubt gathered, Debtmaster is a program (actually, a suite of six programs) which fully automates your debtor accounting. The price of comparable commercial software starts at around \$250, so with the next few editions of *Your*

Computer you'll save the cost of about seven years' subscription — and that's not counting what you'll earn from increased cashflow!

DebtMaster is written in Microworld BASIC, for single- or twin-disk Microbee computers, but conversion for other machines should not be difficult (see below). It lets you set up a debtor accounting system with between one and five reminder accounts at the intervals you choose. Reminders are printed automatically as they fall due, and a paid bills ledger records payments or cancelled or written-off accounts. At any time you can search for a specific account, or for those in a specified category, or get an overview of your business performance. A 300 Kbyte disk will hold about 2000 accounts; a 760 Kbyte disk, about 5000. As most small businesses have no more than a few hundred, this should be more than enough. A feature of the program is its sophisticated error checking — it is almost impossible to make a serious blunder.

The Menu Program

'Debt' is the largest of the Debtmaster programs (8 Kbytes), and is the one that leads you into the accounting system. Type RUN "DEBT" from BASIC to start it or, if your CP/M allows auto-execution of BASIC programs, set it up that way.

Date

When Debt is run it displays the last date on which it was used, and you are asked to enter "Today's date". Notice the 'data filed' system used by the program? The maximum number of characters is designated by a row of stars next to the prompt (for example, DAY: **) and you can type a single character and <RETURN> or two characters (say, "07" or "21") to fill it. This system is used with all data entries.

The date is entered in three fields: the day, the month, and the last two digits of the year. Illegal entries (for example, typing 32 for the day) will be rejected, as will illegal dates (such as 29/2/87 or any date before 1/1/84). If you enter a valid date, the day of the week will be displayed along with a caution if it is before or the same as the last date used or if it's on a weekend. Typing 'Y' accepts it as valid and 'N' rejects it and allows another try.

Note you can 'borrow' from the last date used. Say you last used Debtmaster on 27/8/86 and today is 28/8/86. Enter '28' for the day and <RETURN> for the month, to

```
00001 REM ----- DEBT -----
00002 POKE 140,1: CLEAR: STRS(2000): DIM A(9),B0(9),C0(4):
A(7)=10: A(9)=1: REM Set up arrays & Disable <BREAK> key
00003 CLS: PRINT " Dreamcards": CURS 57,1: PRINT "(c)1986\"[A64 45]:
CURS 1,15: PRINT [A64 45][A63 32]: REM Print title
00004 GOSUB 129: CURS 27,1: INVERSE: PRINT " DebtMaster ": NORMAL:
CURS 0: DISKRESET "A"
```

Get initial data. K3#=Current date, K4#=Last reminder date,
J=Days since 1/1/1984, D=Date access flag, U=Number of entries
on Paid Ledger

```
00005 D=1: J=0: P=0: U=0: K3#="": K4#="": ON ERROR GOTO 6:
OPEN "I",6,"DATE.DBT": IN#60N: OUT#0: OUT#0OFF:
INPUT K3#,K4#,J,D,U
00006 ON ERROR GOTO 0: IN#0: OUT#0: CLOSE 6: IF U>0 THEN 9
```

If no Paid Ledger (U=0) then create one.

```
00007 OPEN "O",6,"PAID.DBT": OUT#6: PRINT CHR(34); SPC(30)
"PAID BILLS LEDGER"; CHR(34)
00008 PRINT CHR(34); " CODES: C=Cancelled D=Discharged P=Part paid@
S=Summons W=Written Off"; CHR(34): OUT#0: CLOSE 6: U=0
```

Date Input routine

```
00009 IF D=0 THEN 37: REM Skip it if D=0
00010 P=J: CURS 1,12: PRINT [A127 32]: CURS 23,3: PRINT
"<<< TODAY'S DATE >>>\"[A127 32]: Please enter today's date!";
IF D=1 THEN LET D=0
00011 R=0: T=0: CURS 37,5: PRINT "Last date used = "; IF K3#=""
THEN PRINT "(Not Set)": GOTO 13
00012 PRINT K3#: X=SEARCH(K3#,"/"): R=INT(VAL(K3#)):
S=INT(VAL(K3#(X+1))): T=INT(VAL(K3#(LEN(K3#)-1))):
REM Get DAY, MONTH and YEAR of last date in R, S & T
00013 CURS 27,7: PRINT "DAY:@@@@@*" SPC(26) "MONTH:@@@@@*"
SPC(26) "YEAR:@@@@@*": GOSUB 130: PRINT "@@Press <RETURN>@
at start of field to 'borrow' from last date";
00014 Z=7: GOSUB 122: IF X=13 AND R>0 THEN 20
00015 L=W: IF L<1 OR L>31 THEN 127: REM L=Day input
00016 Z=8: GOSUB 122: IF X=13 AND S>0 THEN 21
00017 M=W: IF M<1 OR M>12 THEN 127: REM M=Month input
00018 Z=9: GOSUB 122: IF X=13 THEN 22
00019 N=W: IF N<60 AND N<84 THEN 127 ELSE 23: REM N=Year input
00020 L=R: REM
00021 M=S: REM Implement <RETURN> to Borrow from last date
00022 N=T: REM
00023 RESTORE 58: FOR X=1 TO M: READ Z: NEXT X: IF
FRACT(FLT(N)/4)=0 AND M=2 THEN LET Z=29: REM Check that DAY
input doesn't exceed days in that MONTH. Allow for 29th Feb.
00024 X=N: IF L>Z THEN 127 ELSE IF X<84 THEN LET X=N+100: REM Adjust
for dates after year 2000
00025 J=(X-84)*365+INT(FLT(X)/4)+L-1: RESTORE 58: IF M>1 THEN
FOR X=1 TO M-1: READ Z: J=J+Z: NEXT X: REM J=Number of days
since 1/1/84 for new date entry
00026 Z=J-INT(FLT(J)/7)*7: RESTORE 59: FOR X=0 TO Z: READ K2#:
NEXT X: K2#=K2#+"day": REM Calculate the day of the week
00027 K0#=STR$(L): K1#=K0#(J2)+"/*": K0#=STR$(M): K1#=K1#+K0#(J2)
+"/*": K0#="19": IF N<84 THEN LET K0#="20": REM Year string
00028 K1#=K1#+K0#: K0#=STR$(N): K0#=K0#(J2): IF LEN(K0#)=1 THEN
LET K1#=K1#+"0"
00029 K1#=K1#+K0#
00030 CURS 27-LEN(K1#+K2#)/2,12: INVERSE: PRINT " Today is "; K2#;
" "; K1#; " ": NORMAL: REM Display date for checking
00031 K0#="": IF J<P THEN LET K0#="BEFORE the last date used"
00032 IF J=P THEN LET K0#="the SAME as the last date used"
00033 IF ASC(K2#)=83 AND K0#="" THEN LET K0#="on a WEEKEND"
00034 IF K0#(">") THEN CURS 29-LEN(K0#)/2,13: PRINT "That's ";
K0#; " !": REM Display any extra comment
00035 GOSUB 118: IF X=78 THEN 2 ELSE IF X<>89 THEN 35: REM Re-start
if wrong date (User keys "N")
```


combine the day you entered with the month and year of the last date used.

The Menu

The Debtmaster menu will now be displayed. If you haven't fully installed the program the only option available will be 'Set Up Base' (key 'B'), otherwise you will have a choice of eight different functions. Only two can be accessed at this stage (the others will be explained in subsequent articles), as detailed below.

Last Reminders – The last date on which account reminders were sent out (Print option) will be displayed below the menu to remind you to regularly print reminder accounts. The display will not occur at this stage as the Print function has not been included — it is detailed in a later part of this series.

Paid Bills Ledger – Every time a bill is paid (Payment option) an entry is made in a disk file called "PAID.DBT". When this contains a full A4 page of entries, a message will appear asking you to print the Paid bills ledger (Printoption). Do this as soon as possible, as after a few more entries you will be prevented from entering further payments.

Menu Options

Change Date – This option is accessed with key 'C'. It lets you change 'Today's Date', if, say, you have several accounts to be entered and some are already a few days old. If you have a bundle of accounts of varying dates (as you may have when you first install the system) it would be better to use the Date Access switch in the 'Set Up Base' option.

End – Pressing key 'E' allows you to exit from the program and return to CP/M. You will first be cautioned about the importance of backing up the disk, and be told how to do it. Note I've suggested using the Disk Backup routine in DISK.COM, rather than CP.COM; although CP.COM is faster, it does not erase uncopied files from the back-up disk, and this could lead to old accounts remaining on the back-up copy where the entire file had been erased from the Master. When using the Backup program, answer 'Y' to the 'Continue with Format' prompt.

Unfortunately Microbee CP/Ms vary in their ability to load data files. On CIAB systems you will have no problem with the CCPZ version, yet the newer ZCPR II version may prove unreliable. Try to beg, borrow or steal a CP/M version of CCPZ if you want 100 per cent reliability.

```
00036 GOSUB 129: K3#=K1#: GOSUB 128
```

MENU PAGE: Get Base data

```
00037 FOR X=1 TO 9: B0$(X)="": NEXT X: REM B0$=Base string array
00038 Y=0: ON ERROR GOTO 40: OPEN "I",6,"BASE.DBT": IN#6ON: OUT#0:
OUT#0OFF: REM Get Base data
00039 FOR X=1 TO 9: INPUT A(X),B0$(X): NEXT X: Y=A(1)
00040 ON ERROR GOTO 0: IN#0: OUT#0: CLOSE 6: GOSUB 117:
K0$="<FUNCTION>@@@@@<KEY>": IF Y>0 THEN CURS 9,3: PRINT K0$:
SPC(8): K0$
00041 IF A(8)=0 THEN LET A(8)=65: REM Default page length
```

PAGE DISPLAY: Y determines display if Base/no Base

```
00042 IF Y=0 THEN CURS 21,5: X=4: GOSUB 139: PRINT\ SPC(20): X=8:
GOSUB 139: CURS 14,10: PRINT "This program will not operate@
unless\ SPC(14) "you first set its base parameters.": GOTO 47
00043 IF K4$<>" THEN CURS 16,13: PRINT "Last Reminders sent on "; K4$
00044 X=1: FOR E=1 TO 4: CURS 8,E+4: GOSUB 139: PRINT SPC(8):
GOSUB 139: NEXT E: IF A(6)=0 THEN LET A(6)=2
00045 CURS 16,14: X=52-U: IF X<1 THEN PRINT "PAID BILLS LEDGER MUST@
BE PRINTED" ELSE PRINT "Paid Ledger has"; X; " entries left"
00046 IF VAL(K3#)>0 THEN CURS 28,11: PRINT K3#: REM Print date
```

Implement User's Selection

```
00047 ON ERROR GOTO 0: CURS 1,16: PRINT [A50 32]: CURS 2,16:
PRINT "Key? X": CHR(8)
00048 GOSUB 119: PRINT K0$: CURS 0: IF K0$="B" THEN GOSUB 117:
GOTO 61 ELSE IF Y=0 THEN 55
00049 ON ERROR GOTO 47: IF K0$="C" THEN LET U=U+1000: GOSUB 128:
K0$="N": REM U is used as a flag if "Change" selected.
00050 IF K0$="D" THEN GOSUB 117: GOTO 10: REM Alter Date
00051 IF K0$="N" THEN RUN "NEW": REM New Account or Change
00052 IF K0$="P" AND U<100 THEN RUN "PAY": REM Payment
00053 IF K0$="X" THEN RUN "PRI": REM Print
00054 IF K0$="S" THEN RUN "SEA": REM Search
00055 IF K0$<>"E" THEN 57 ELSE IF D=0 THEN LET D=1: REM End
00056 GOSUB 128: CLS: CURS 16,7: PRINT "DON'T FORGET TO BACK-UP@
THIS DISK\ SPC(22) "Type DISK <RETURN>": CURS 0: PLAY 0,20:
POKE 140,0: SYSTEM
00057 GOTO 47

00058 DATA 31,28,31,30,31,30,31,31,30,31,30,31
00059 DATA "Mon","Tues","Wednes","Thurs","Fri","Satur","Sun"
00060 DATA "Change Account","C","Change Date","D","New Account",
"N","Set-up Base","B","Payment","P","Search","S","Print","X",
"End","E"
```

SET-UP/CHANGE BASE ROUTINE

Page #1: Display

```
00061 FOR E=1 TO 8: CURS 24,3: PRINT "<<< CHANGE BASE >>>"
00062 FOR X=1 TO 5: CURS 19,X+4: PRINT "Days to Reminder No.": X:
GOSUB 116: NEXT X
00063 X=6: CURS 19,10: PRINT "Address Lines Down@@@": GOSUB 116:
PRINT SPC(3-LEN(K0$)): "(1-30)"
00064 X=7: CURS 19,11: PRINT "Left Margin Indent@@@": GOSUB 116:
PRINT SPC(3-LEN(K0$)): "(0-20)"
00065 X=8: CURS 19,12: PRINT "Form Length": SPC(11): GOSUB 116:
PRINT SPC(3-LEN(K0$)): "(50-80)"
00066 GOSUB 130: CURS 3,16: PRINT "Press <RETURN> if same, <ESC>@
for next page or <A> to Abort": K0$="": GOSUB 121
```

Page#1: Data entry

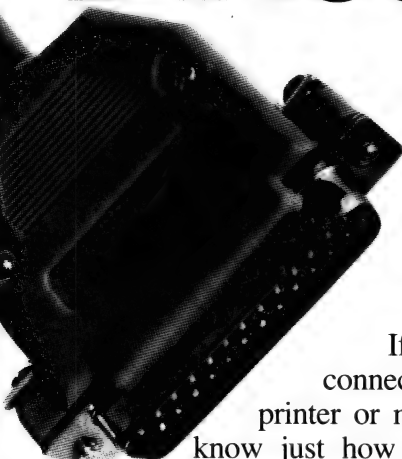
```
00067 GOSUB 125: IF X=65 OR X=97 THEN 37 ELSE IF X=27 THEN 79 ELSE
IF X=13 THEN 69 ELSE IF X<48 OR X>57 THEN 67
00068 K0$=K0$+CHR(X): GOSUB 121: IF E<6 AND LEN(K0$)<4 OR LEN(K0$)<3
THEN 67
```


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WHEN YOU WANT THE BEST

Debtmaster

Set Up Base – This option (key 'B') lets you customise Debtmaster to best suit your particular business. The parameters you can change (or set) are as follows:

■ **Days to Reminder** – You can have from one to five reminder letters after the initial account. If you decided on three, for example, you could set the first at 30 days, the second at 60 days and the third at 90 or 120 days. The fourth and fifth would be left at 0 (inoperative).

■ **Address Down** – This is the number of lines down from the top of the page at which the debtor's name and address is printed on reminders. Set it so the address can be seen when the reminder is put in a window-faced envelope. The default value is 2 — try 10 or 12 if using letterhead paper.

■ **Indent** — Width of left margin of reminders. The default value is 10.

■ **Form Length** – Refers to the length (number of lines) of the particular fanfold stationery being used for reminders; this is not used if reminders are being printed on single sheets. The default value is 65 (A4 size).

■ **Printer Type** – Lets you set the output to suit your printer. The default value is 1 (parallel printer).

■ **Date Access** – If it's set to '2', then every time you leave a subsidiary program you will return to the 'Today's Date' prompt. This is useful when starting the system, since old accounts can be entered with a minimum of fuss. When all old accounts are on the system, set this parameter to '0' to bypass the date prompt.

■ **Name** – This and the next two entries should be ignored if you are using letterhead paper for reminders, otherwise this option lets you enter your name for printing at the top of the reminder form.

■ **Occupation** – Enter your occupation (for example, Plumber, Architect, Haulier or whatever).

■ **Address** – Enter your business address (don't forget the postcode).

■ **Reminder Text** – This allows you to enter (or change) the text for each reminder account. You can review them by answering 'Y' to the 'Change Reminders' prompt which follows the business details page, but *do not* answer 'Y' to 'Change Reminder?' when a reminder letter is on the screen, unless you actually want to change it. Note that pressing the <RETURN> key at the start of a line of the reminder will erase any text which was on that line in the original

```
00069 Z=INT(VAL(K0$)): IF K0$=" " THEN 78
00070 IF E=1 OR E>5 OR Z=0 THEN 72 ELSE IF Z<A(E-1)+7 THEN 115
00071 FOR X=2 TO E: IF A(X-1)=>Z OR A(X-1)=0 THEN NEXT X 115 ELSE
NEXT X: REM Check all reminder dates are legal
00072 IF E>4 OR Z>0 THEN 74
00073 IF A(E+1)>0 THEN FOR X=E TO 5: A(X)=0: NEXT X: NEXT E 61: REM
Set subsequent reminders to 0 if earlier reminder cancelled
00074 IF E=6 AND Z<1 OR E=6 AND Z>30 THEN 115: REM Check that Address
Lines Down is within range
00075 IF E=7 AND Z>20 THEN 115: REM Check Margin Indent is in range
00076 IF E=8 AND Z<50 OR E=8 AND Z>80 THEN 115: REM Check Form
Length is within range
00077 A(E)=Z: REM Set Base variable
00078 NEXT E: Do next variable
00079 GOSUB 118: IF X=78 THEN 37 ELSE IF X<>89 THEN 79
```

Page#2: Display

```
00080 IF A(1)=0 THEN 113 ELSE GOSUB 117: CURS 20,4: PRINT
"PRINTER TYPE:"\ SPC(19) "Set to 1 for Parallel printer"
00081 PRINT SPC(19) "or 4 for Serial 300 baud or 5"\ SPC(19)
"for Serial 1200 baud printers"
00082 PRINT\ SPC(19) "DATE ACCESS:"\ SPC(11) D\ SPC(19)
"Set to 2 if you have to enter"\ SPC(19)
"old accounts of varying dates"
00083 PRINT SPC(19) "or to 0 if accounts are being"\ SPC(19)
"entered on a daily basis"
00084 GOSUB 130: CURS 11,16: PRINT "Press <RETURN> if same or<
<ESC> for next page";
```

Page#2: Data Entry

```
00085 CURS 43,4: PRINT A(9); CHR(8);: GOSUB 125: IF X=13 THEN 87
ELSE IF X=27 THEN 88
00086 X=X-48: IF X<>1 AND X<>4 AND X<>5 THEN 85 ELSE LET A(9)=X:
PRINT CHR(X+48)
00087 CURS 43,9: PRINT D; CHR(8);: GOSUB 125: IF X=13 OR X=27
THEN 88 ELSE LET X=X-48: IF X<>0 AND X<>2 THEN 87 ELSE
LET D=X: PRINT CHR(X+48)
00088 GOSUB 118: IF X=78 THEN 37 ELSE IF X<>89 THEN 88
```

Page#3: Display

```
00089 K0$="Enter": IF B0$(5)=" " THEN LET K0$="Change"
00090 GOSUB 130: PRINT K0$; " business name/address details@
(Y/N)? *"; CHR(8);
00091 GOSUB 117: IF K0$="N" THEN 99 ELSE IF K0$<>"Y" THEN 91
00092 GOSUB 117: CURS 1,3: PRINT "If you are NOT using letterhead@
paper for accounts then you can enter your name, occupation@
and address here."
00093 GOSUB 130: CURS 8,16: PRINT "Press <RETURN> for new line or<
<ESC> for next page";
00094 CURS 7,14: PRINT "NOTE: All text on line will be erased@
after <RETURN>"
```

Page#3: Data Entry

```
00095 G=63: FOR W=6 TO 9: GOSUB 137: V=W+1: IF W=7 THEN LET V=9
ELSE IF W>7 THEN LET V=W+3
00096 GOSUB 131: IF X=13 THEN 97 ELSE IF X=27 THEN NEXT W 98 ELSE
IF K0$=" " THEN 96
00097 B0$(W)=K0$: NEXT W: REM B0$(6)-(9) hold name/address details
00098 GOSUB 137: GOSUB 118: IF X=78 THEN 37 ELSE IF X<>89 THEN 98
```

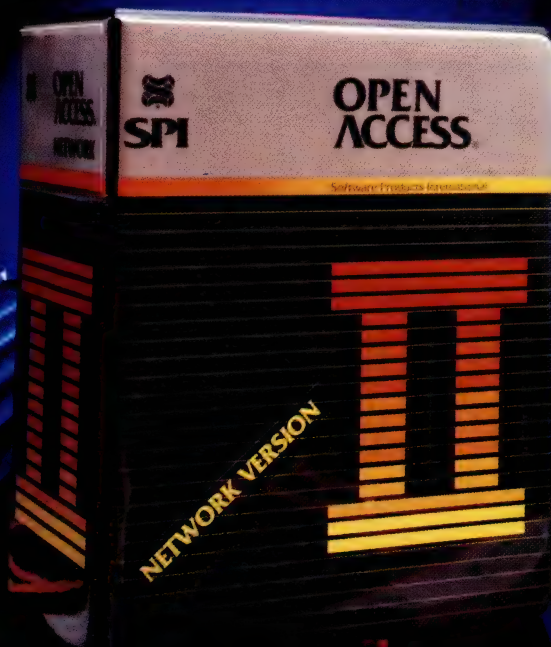
Page#4: Display

```
00099 Z=0: FOR X=1 TO 5: IF A(X)=0 THEN LET B0$(X)=" ELSE IF
B0$(X)=" " THEN LET Z=1: REM Erase Reminder text if number of
days not set.
00100 IF Z=1 THEN 102 ELSE GOSUB 130: PRINT "Change Reminder/s@
(Y/N)? *"; CHR(8);
```


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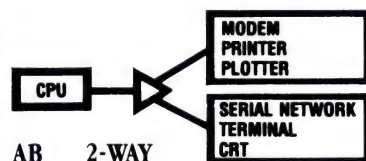
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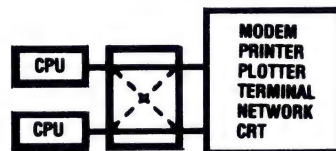
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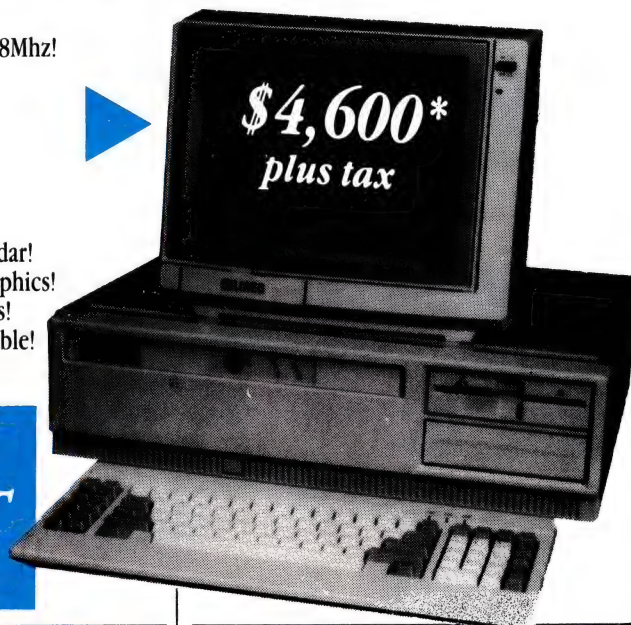
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If you have decided to use three reminders, the text for each might be as follows:

Reminder 1: *Your account is overdue. Please settle it as soon as possible.*

Reminder 2: *This account is now long overdue. Immediate payment is required.*

Reminder 3: *Our previous reminders to this overdue account have been ignored. Unless it is settled within seven days then legal action will be taken without further notice.*

Once these parameters have been entered they will be saved, and the program will revert to the menu. You can come back to the Set Up Base routine at some later time and change them if required.

Files

Debtmaster data files have .DBT extensions and can be inspected with the CP/M 'TYPE' command. The files it will create are —

DATE.DBT: This holds the current date and a few other bits of miscellaneous information.

BASE.DBT: The data entered with the key function is stored in this file.

PAID.DBT: This is the 'Paid Bills' ledger.

X.DBT: These are account files (the File-Name may be any letter of the alphabet).

TEMP.\$\$\$: A temporary storage file.

When this first part of the program is run, the first three files will be added to the disk. The other two types are created by the NEW sub-program (see next Part 2).

Entering the Program

You'll need two blank, formatted disks with the CP/M system installed on them. Label one as the main disk and the other as a back-up. Now proceed as follows:

(a) Copy the files `2.COM` (alphabetical directory program), `DISK.COM` (disk utility), `SETUP.COM` (CP/M initialisation program) and `BASIC.COM` from your CP/M Master disk onto both disks.

(b) Use `SETUP` to set CP/M to auto-execute BASIC on cold boots and the keyboard default to 'lower case'. Erase the `SETUP` program once this has been done.

Now type in `DEBT`, leaving out all REMs except line 1. The following points are important (they apply to all the Debtmaster programs):

(a) Variables I, O and Q have not been used, to avoid confusion with ones and zeroes.

(b) Where more than one space is required in text or a string, or a space occurs at the end of a line, I have put "@" character/s. Enter a space for each '@'.

(c) The fancy line indenting was created with Wordstar, to make the listing easier to read. Do not try to duplicate it.

(d) Use POKE 140,0 rather than POKE 140,1 in line 2 until the program is running properly. This allows you to use the BREAK key if required.

Once DEBT (or the particular sub-program you're entering) is working correctly, use the GX command to remove all unnecessary spaces (that is, other than those inside double inverted commas or square brackets, or where a space follows a NEXT*v or DATA command). Change to POKE 140,1 in Line 2 and save the program as your working copy.

Unfortunately I don't have time to answer programming queries about Debtmaster. After some of my earlier articles, people sent me reams of listings, wanting me to pick their typing mistakes. I don't want to go through that again!! If the thought of typing 28 Kbytes of code gives you the horrors, you can buy the full suite of programs on tape (copy to disk with CLOAD and SAVE) from Dreamcards, 8 Highland Court, Eltham North 3095 –*mail order only*). The cost is \$45, including postage. If you have an 8 cm disk system, send a disk with your order and I'll put the programs and instructions on it for you. For those people who buy the program from me, the articles in *Your Computer* will still be necessary as documentation.

If you decide to buy Debtmaster from me, please note I retain full copyright until three months after the last article in this series (Part 6) is published. After that Debtmaster is public domain and you can give copies to whoever you like!

Conversion to Other BASICs

Debtmaster is such an important business tool that owners of other brands of computers may want to convert it to run on their systems. This should not be difficult on a computer with an advanced BASIC interpreter (that is, over 12 Kbytes), 32 Kbytes of memory available to BASIC and a screen format of at least 64 by 16. If your computer doesn't qualify, stick to arcade games or trade it in!

To convert Debtmaster, you'll need to know some of the oddities of Microworld BASIC. Its non-standard features are as follows –

Variable Types – Microworld BASIC requires variables to be stated in accordance with a strict format. Integer variables (whole numbers) are designated with a single letter, and will be described in this

```
00101 GOSUB 119: IF K0$="N" THEN 113 ELSE IF K0$<>"Y" THEN 101
00102 FOR E=1 TO 5: IF A(E)=0 THEN 112: REM Ignore unset reminders
00103 GOSUB 117: CURS 21,3: PRINT "<<< REMINDER TEXT"; E; " >>>"
"OLD:": K0$=B0$(E): IF K0$="" THEN CURS 26,6: PRINT
"(Not defined.):": GOTO 106
00104 FOR X=5 TO 8: K1$=K0$: Z=SEARCH(K1$,CHR(124)):
K1$=K1$(;1,Z-1): K0$=K0$(;Z+1)
00105 CURS 13,X: PRINT K1$: NEXT X
00106 CURS 1,10: PRINT "NEW:": FOR X=10 TO 13: CURS 13,X: PRINT
[A40 42]: NEXT X
```

Page#4: Data Entry

```
00107 IF B0$(E)="" THEN 109 ELSE GOSUB 130: PRINT
"Change text (Y/N)? *"; CHR(8);
00108 GOSUB 119: IF X=78 THEN 112 ELSE IF X<>89 THEN 108
00109 G=53: FOR V=10 TO 13: GOSUB 130: CURS 20,16: PRINT "Press0
<RETURN> for new line"; GOSUB 131: C0$(V-9)=K0$: NEXT V
00110 K1$="": FOR W=1 TO 4: K1$=K1$+C0$(W)+CHR(124): C0$(W)="":
NEXT W: REM CHR(124) delimits text lines
00111 GOSUB 118: IF X=78 THEN 103 ELSE IF X=89 THEN LET B0$(E)=K1$
ELSE 111
00112 NEXT E
```

Save new Base and return to Menu once done

```
00113 GOSUB 130: CURS 26,16: PRINT "-Saving Base-": CURS 0
00114 OPEN "0",6,"BASE.DBT": OUT#6: FOR X=1 TO 9: PRINT A(X); ", '":
B0$(X); "'": NEXT X: OUT#0: CLOSE 6: GOSUB 128: GOTO 2
```

MISCELLANEOUS ROUTINES & SUBROUTINES

```
00115 GOSUB 130: CURS 21,16: PRINT "<<< ILLEGAL VALUE >>>": CURS 0:
PLAY 22,1; 0,15: GOTO 61
00116 PRINT " =": K0$=STR(A(X)): PRINT K0$: "@@": RETURN
00117 FOR X=3 TO 14: CURS 1,X: PRINT [A64 32]: NEXT X: RETURN:
REM Erase screen section
00118 GOSUB 130: PRINT "Is this correct (Y/N)? *"; CHR(8);
00119 GOSUB 125: IF X>96 AND X<123 THEN LET X=X-32: REM Convert lower
case key input into a capital
00120 K0$=CHR(X): RETURN
00121 CURS 43,E+4: PRINT K0$: RETURN
```

This routine gets a two digit numeric input in K0\$

```
00122 K0$="": W=0: CURS 35,2: PRINT " ": GOSUB 125: IF X=13 THEN
RETURN ELSE IF X<48 OR X>57 THEN 122 ELSE LET K0$=CHR(X):
W=X-48: GOSUB 124
00123 GOSUB 125: IF X=13 THEN LET X=0: RETURN ELSE IF X<48 OR X>57
THEN 123 ELSE LET K0$=K0$+CHR(X): W=W*10+X-48
00124 CURS 36,2: PRINT K0$: RETURN
```

Get key in X:

```
00125 X=ASC(KEY$): REM Clear key buffer
00126 X=ASC(KEY$): IF X=128 THEN 126 ELSE RETURN: REM If X=128 then
no key was pressed.
00127 GOSUB 130: CURS 23,16: PRINT "<<< INVALID DATE >>>": CURS 0:
PLAY 22,1; 0,10: GOSUB 130: GOTO 10
```

Store new date file

```
00128 OPEN "0",6,"DATE.DBT": OUT#6: PRINT "'': K3$: "'", "'": K4$:
"'," J; ", " D; ", " U: CLOSE 6: IN#0: OUT#0: RETURN
```

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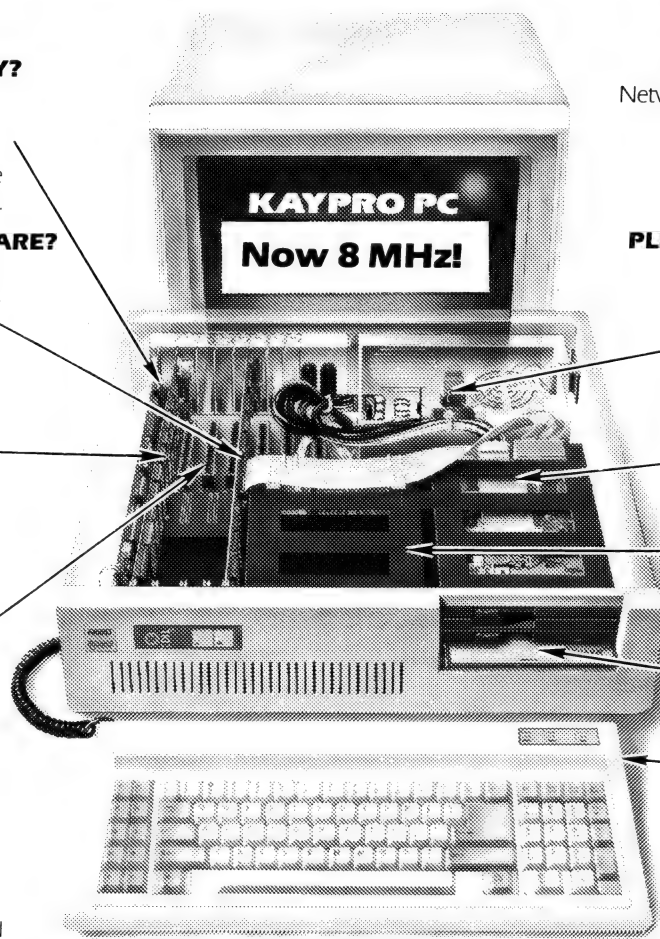
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explanation as 'i'. Real variables (numbers having a fractional part) are designated by a letter and a number (for example, F1), and will be represented by 'r'. Strings are designated in the same way as real numbers, but end in a '\$' sign (for example, A1\$); I will use 's\$' to indicate a string. These rules should not result in difficulties with conversion, as other BASICs usually accept variables named in this way.

Sub-string Extraction – Throughout the programs you will see commands such as `s1$=s2$(;1,20)`. This is the Microworld equivalent of `MID$`, `LEFT$` and so on, `s2$` being the string that is to be dissected, `s1$` being the string in which the result is stored, and the integers within the brackets being the first and last letters of `s2$` that are to be included in `s1$`. Thus if `s2$="Calamity"` and `s1$=s2$(;2,4)`, then `s1$` will be "ala". If only one integer is in the brackets, then that letter to the end of the string will be included in the sub-string. Using our last example, if `s1$=s2$(;4)` then `s1$` would be "amity". ▷

```
00129 GOSUB 130: CURS 30,16: PRINT "-Wait-";: CURS 0: RETURN
```

```
00130 CURS 1,16: PRINT [A63 32];: CURS 1,16: RETURN: REM Clear  
bottom line of screen
```

Text Input Routine

```
00131 H=13: K0$="": CURS 12,V: PRINT " ";  
00132 GOSUB 125: IF X=124 THEN 132 ELSE IF X=13 OR X=27 THEN RETURN  
REM Get key. End if <RETURN> or <ESC>
```

```
00133 IF X<>8 AND X<>127 THEN 135 ELSE IF H>13 THEN CURS H,V:  
PRINT CHR(8); " "; CHR(8);: H=H-1: K0$=K0$+CHR(8);: LEN(K0$)-1)  
ELSE CURS 12,V: PRINT " ";: REM <DEL> & <BACKSPACE> keys
```

```
00134 GOTO 132
```

```
00135 CURS H,V: PRINT CHR(X);: H=H+1: K0$=K0$+CHR(X): IF H<G  
THEN 132: REM Add key to string (G=Max. length allowed)
```

```
00136 RETURN
```

```
00137 CURS 1,7: PRINT "Name:"; SPC(7) [A50 42]: CURS 13,7: PRINT  
B0$(6)\\ "Occupation: "; [A50 42]: CURS 13,9: PRINT B0$(7)\\
```

```
00138 PRINT "Address: @@@@"; [A50 42]: CURS 13,11: PRINT B0$(8)\\  
SPC(12) [A50 42]: CURS 13,12: PRINT B0$(9): RETURN
```

```
00139 RESTORE 60: FOR Z=1 TO X: READ K0$,K1$: NEXT Z: PRINT K0$;  
SPC(18-LEN(K0$)): INVERSE: PRINT " "; K1$; " "; NORMAL:  
X=X+1: RETURN: REM Print Menu Item X
```

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The grandfather of the micro industry, the ageing Apple II, may never die. In an industry where a six-month product life almost qualifies as long service, the nine-year-old Apple has just been rejuvenated in a spectacular new release, the II GS.

GS stands for Graphics and Sound, and the newcomer has plenty of those – it's Apple's answer to the new-wave 'pre-

tenders', Commodore's Amiga and Atari's ST. And before you start spluttering at the thought of an Apple II matching these supermicro-powered newcomers, you should take a closer look at its specifications.

The II GS features a 65C816 processor, a new hybrid 8- and 16-bit chip which handles code written for the old 6502, as well as powerful new 16-bit software. This single piece of silicon is Apple's major weapon, as it allows the release of the machine with around 9000 ready-to-run software packages.

While everyone else sits twiddling thumbs waiting for software to be written for their more radical new machines, Apple hits the market with the benefit of nine years of support. The new II GS runs around 90 per cent of already existing Apple II software, which totals around 10,000 packages these days!

But Apple isn't just selling a faster Apple II — it is also releasing a new generation of software which takes full advantage of the machine's capabilities. Anyone who was impressed when they first saw

GREAT SCOTT — SHE'S APPLES

It's an Apple II compatible with star power to rival that of the Amiga, and it's called the II GS — in which GS stands for graphics and sound, Granny Smith, or "Great Scott!", when you're left gaping by the display. Matt Whelan went to the orchard to preview this latest Apple-too.

Macpaint (and that's basically everyone who saw it) will get the same feeling when they see GS Paint — a high-powered version of the Mac program with colour (128 palettes of 16 colours each, for 4096 colours) and animation. Graphic Writer is a clever combination of word processor and draw program, while the rock music I heard from a set of Bose speakers attached to the II GS sounded almost-suspiciously like FM radio.

Heart Of Gold

With three million users around the world (80,000 of them in Australia), the Apple II has been something of a gold mine. Rather than throw that away (and disappoint II fans), Apple compressed the II onto a single chip — called the Mega II — and built it into what was otherwise an almost totally new machine.

It retained Apple II-style expansion slots (existing Apple II expansion cards will slot straight in), but built in a headphone jack, modem and printer ports, Appletalk networking, a 'smart port' controller for both microfloppy and minifloppy drives, RGB colour video, composite video, and a 'desktop bus' connector which allows daisy chaining of up to 16 input devices including keyboard, mouse, barcode readers, and so on.

The graphics component of the GS label is provided by a three-standard Video

Graphics Controller chip which adds high resolution (320 by 200 pixels) and 'super-high resolution' (640 by 200) colour to its standard (560 by 192) monochrome video mode. The sound portion comes from an Ensoniq 32-oscillator chip, which can produce voice or sound, with up to 15 musical instruments available at once. Apple has worldwide rights for the use of this chip in PCs — it also features in several professional-quality synthesisers from instrument makers such as Yamaha.

The standard machine comes with 512 Kbytes of RAM (expandable to 8 Mbytes) and 128 Kbytes of ROM (expandable to 1 Mbyte). The toolbox ROM provides Macintosh-style routines, such as Quickdraw to allow a Mac-style user-friendly, graphics-oriented interface. A mouse is standard.

"We made computers available to the masses with the original Apple II" said Apple Australia managing director David Strong at the II GS release. "Then with the Mac we made them usable. Now we've combined both philosophies in the II GS."

"It provides existing Apple II users with a valid and economical upgrade path, and provides the power and features they want these days," he said.

Not A Screw Loose

Design ergonomics in the II GS have now extended to the nuts and bolts — there aren't any. It comes apart (right down to removal of the power supply) without tools, and access is easy in all areas.

The motherboard retains Apple II compatibility with a (unused) power-supply



connector to match the old machine and a games port for old-style controllers (and copy-protection hardware). The board can be plugged into an Apple II case, and is being offered to existing owners as a retrofit upgrade.

The processor runs at 2.8 MHz, but can be slowed to the old machine's 1 MHz under software control. This is set with a Mac-style 'control panel' which also allows selection of screen colours, date formats, date and time-setting (a clock is built in and provides file date-stamping), port settings, selection of keyboard and screen character sets, and so on.

To simplify world-wide distribution Apple has built eight international character sets into the Mega II chip. You can even select a Dvorak keyboard layout from the control panel.

An SCSI interface card is available as an option, and with this you can connect the new 20 Mbyte Apple hard disk, which provides five times the throughput speed of the Macintosh hard disk (the new drive is also available for the Mac).

The new machine is being sold in two standard packages: with a black-and-white monitor it will cost \$3495; with a colour monitor, \$3995. These prices include a 9 cm disk drive. For anyone who wants a 13 cm drive, the price will be slightly (\$100 or so) less. □

PADMEDE PLUS

Chartered accountant, Dan Lawrence reviews a new version of the Accounting Software System, specially adapted and written for the IBM PC and compatibles. How will you account for your small business?

If you were to judge this book by its cover, your first impression of Padmede, going by the size and thickness of its instruction manual, would be that this is a midget in the world of accounting software. But the Padmede computerised accounting system should find its niche in small- to medium-sized businesses, and would also be suitable for accountants providing accounting and taxation services to small-business clients.

The original Padmede package has been around for some years, and has over 3000 users in over 100 different types of business. The Australian distributors of Padmede, Personal Computer Software, recently released Padmede Plus, an upgraded, MS-DOS version with many new features. Originating in the UK, the software has been thoroughly Australianised, and will also operate on CP/M machines.

Padmede will work satisfactorily on a twin floppy system.

However, use of a 10

megabyte hard disk would provide optimum capacity, and it should be noted that the software will run faster on a machine with a faster microprocessor, such as the Olivetti M24 or the Compaq PC.

Features

The main system menu indicates the options available to the user. These consist of the usual accounting package modules — Trade Debtors, Invoicing, Inventory, Trade Creditors and General Ledger — and a separate module is used for Creditors Cheque Writing.

There is some degree of integration possible with the software. Thus, the General Ledger will integrate with both Debtors and Creditors modules, while Sales Invoicing will integrate with both the Debtors Ledger and the Inventory module.

One feature which is missing is integration between the Creditors system and the Stock module. An enterprise which relies on the purchase and sale of goods and has a fairly large inventory would need, in respect of products purchased, to input all data into the Stock module as a separate exercise to increase inventory balances. The omission of this facility would not be

20





Taking Care of Business

an important factor where sales invoices raised are only for services rendered or where the number of items in the inventory is fairly small.

All menus used in the modules are uniform in character, with sections for getting started, daily/weekly procedures, and reports and period-end procedures.

Files can be expanded at any time without loss of existing data. Not only is this valuable in a floppy disk system, but it is a useful feature if the user decides to acquire and transfer files to a hard disk system.

All operator errors produce a beep warning signal, and a self-explanatory error message appears on the screen. Examples are invalid dates, products not on file and code numbers outside the limits of 1 to 94. A beep warning is also given if a customer's new purchase exceeds the set credit limit, with an option to accept or reject the order. Input data is comprehensively validated and errors can be corrected easily before acceptance.

Interesting new features which have been added in the latest version include the Alpha Search and Transaction Retention. Alpha search enables a user to find a customer account by typing from 1 to 8 letters of the name. And, both in the debtors and general ledgers, it is now possible to retain transactions for an indefinite period of time. This facility eliminates the need to retain hard copies of monthly reports, and also provides a full history for each customer or general ledger account on a single document.

Other new features are a facility to allow user-design of invoices, multi-page invoicing and the spooling of invoices to disk for continuous hard copy printout. It is also possible to design the output style of cheques.

Registered users can obtain assistance and technical support from the supplier's hotline, and may purchase enhancements to the system at reduced rates.

Features not provided by the system are bank deposit details, thus necessitating journal entries for non-debtor cash receipts, and cheques for non-creditor payments (which would include wages and petty-cash reimbursements).

Padmede Plus does not link to any word processing, database or spreadsheet system, though the developer is currently working on integrating the system with a word processor, to assist in the preparation of accounting reports.

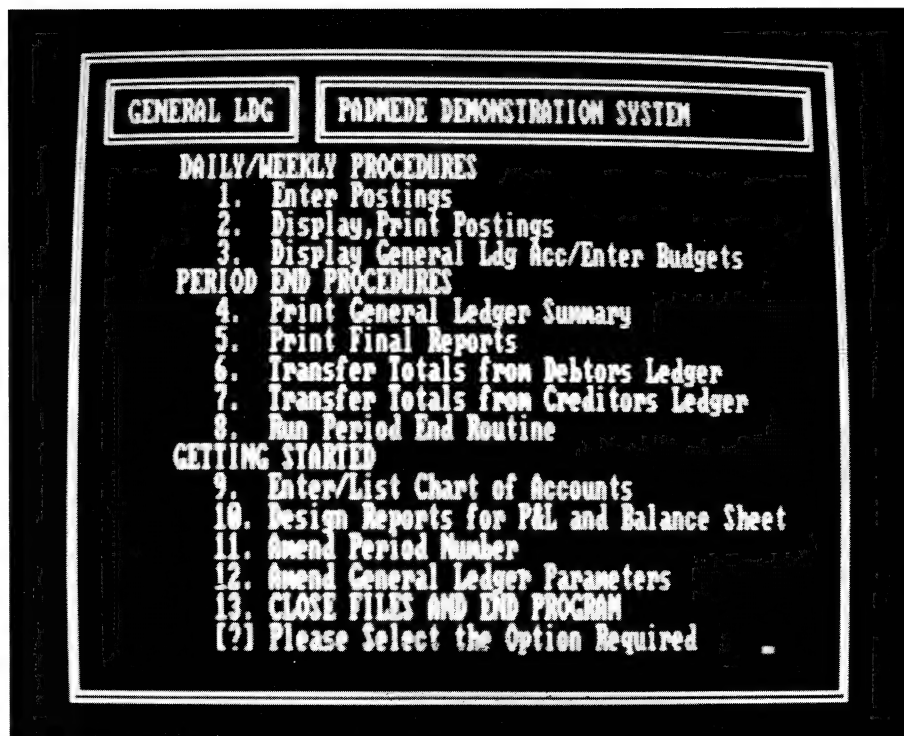


Figure 1. Padmede's Main System Menu. The General Ledger will integrate with Debtors and Creditors, while Invoicing will integrate with Debtors and the Stock System.

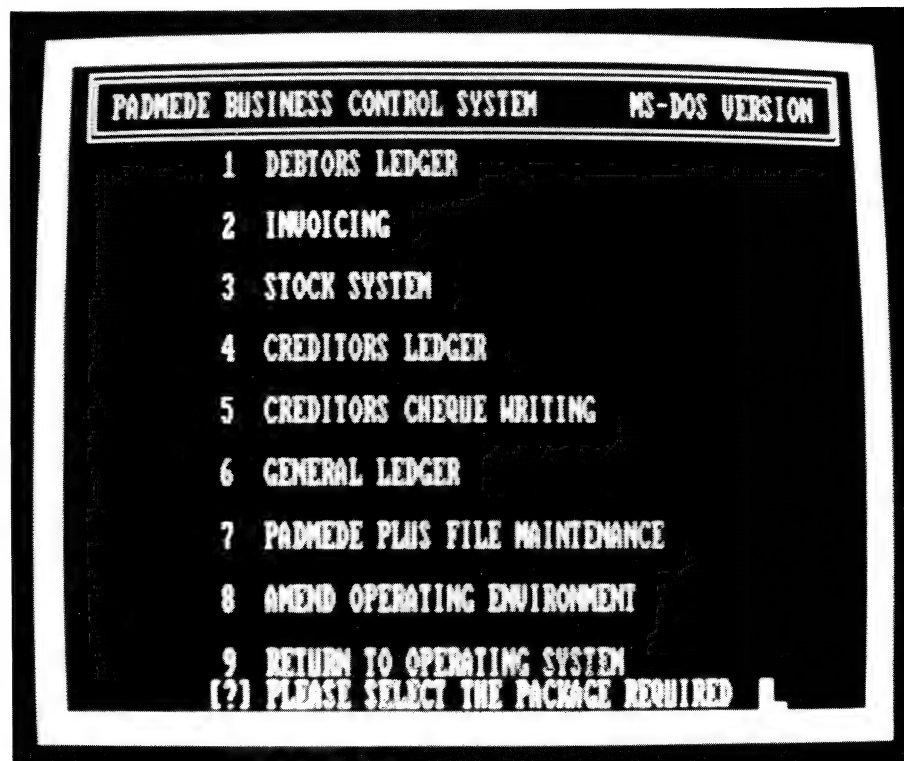


Figure 2. Each module in Padmede uses a uniform menu.



Taking Care of Business

Default Features

Default data items and values are found in the modules. These help to reduce the number of keystrokes required for data entry and, thus, the amount of operator time required to complete work schedules. Defaults include use of the system date or the last date used; both invoice and cheque numbers increment automatically, as do data-entry reference numbers; and a description can be duplicated from the previous line.

One module which appears to have a high level of automation is Sales Invoicing. The defaults in this module provide a major saving in time. Not only are dates and consecutive numbers provided for, but, by keying in the customer account number, product code and quantity sold, program defaults take the customer name and address from the customer file, and product information from the product file, with all arithmetic computations automatically performed, including the calculation of sales tax, if applicable. In addition, the total value of the invoice is automatically posted to the particular debtor's account.

Data entry is by the batch mode, with a limit of 56 entries per batch. This should be adequate for most situations. An important feature of the batch-entry system is the totals of all the debit and credit entries must agree. By default, this conforms to the needs of the double-entry principle.

The Manual

The manual is easy to read, offering simple step-by-step instructions to assist first-time users. The early part of the manual provides a host of helpful hints regarding the use of hardware and DOS, and floppy disk preparation and use.

In addition, the manual provides a section for each specific module, with a fully indexed contents page, as well as illustrated samples of the reports provided by each program in the system.

In the installation guidelines, an effort is made to explain double-entry accounting, classification of accounts and the difference between Revenue and Balance Sheet items — it's a basic accounting tutorial. The terminology used throughout the manual is Australian in character and conforms to modern commercial usage.

There are two errors in the examples given of General Ledger printouts. The important one relates to goodwill, which is classified as a Current Asset. By its very nature, goodwill represents the excess

Interesting new features which have been added in the latest version include the Alpha Search and Transaction Retention. Alpha search enables a user to find a customer account by typing from 1 to 8 letters of the name. And, both in the debtors and general ledgers, it is now possible to retain transactions for an indefinite period of time.

amount paid for acquiring the net assets of another enterprise; it has no realisable value. On the other hand, Current Assets represent cash or assets which will be converted into cash within 12 months of balance sheet date. Goodwill should be classified as an Intangible Asset. The second error is in the Profit and Loss Statement, which describes Sales Income, less the Cost of Sales as Nett Income. The correct description is Gross Profit.

Limitations

When used with a 360 Kbyte floppy disk system, there are inherent limitations to data file sizes, such as 1000 accounts with 2000 outstanding transactions for both debtors and creditors. But the system is flexible and will allow fewer accounts with more outstanding transactions. Capacity is doubled on hardware systems which use 720 Kbyte floppy drives. Where volume is a problem, a hard disk system would raise capacity to 10,000 accounts and 32,000 outstanding transactions, as well as speeding up disk access time.

The software has been written in compiled BASIC, and is noticeably slow in setting up the general ledger chart of accounts, which has a limited range of numbers from 100 to 999. For most small businesses, this should be adequate. Once the chart of accounts has been created it can be re-used for subsidiary companies, and

by accountants for their clients. Branches, departments, divisions and cost centres are catered for by the use of an additional two digits, as sub-analysis codes.

Padmede Plus is specifically written for MS-DOS machines. However, the left and right arrow keys do not function. To correct mistakes, it is necessary to use the backspace key and then retype the correct characters. By using the Esc key, the user can return to an earlier part of the module, make entries therein, then come back to the program area previously worked on to continue processing.

The software does not allow a change in system date during processing without having to exit and re-enter the system from DOS — this feature is available in other packages. Nor does it allow more than one trade discount rate for customers. Credit limits are set in hundreds of dollars. While this may save some keystrokes, it is confusing. A credit limit of \$40,000 needs to be entered as \$400 hundreds.

Product code groups could not be tested, as they were excluded from the demonstration-only review package, as was the debtors ledger parameter setting for using preprinted stationery.

Accounting Principles

All Padmede modules adhere to the principle of double-entry accounting, with control totals to ensure that data entry is complete. If the double-entry requirements are not adhered to, the system will not allow the operator to continue. This feature ensures the accounting system will always be in balance, an absolute essential in the world of accounting. For both debtors and creditors data details, double entry is automatic.

Designing the format of output reports for the Balance Sheet and Revenue Statements, with appropriate headings and terminology, is an option available to the user. This makes it possible to prepare statements which conform to the requirements of the Companies Code and the accounting standards required by The Institute of Chartered Accountants.

Two methods of valuing stock on hand are available — weighted average cost and last purchase price. The latter would be suitable only if all unsold stock had been purchased at that price, otherwise stock items purchased at an earlier date at lower prices would be overvalued, with the consequent overstatement of profits. With this reservation, both methods of inven-

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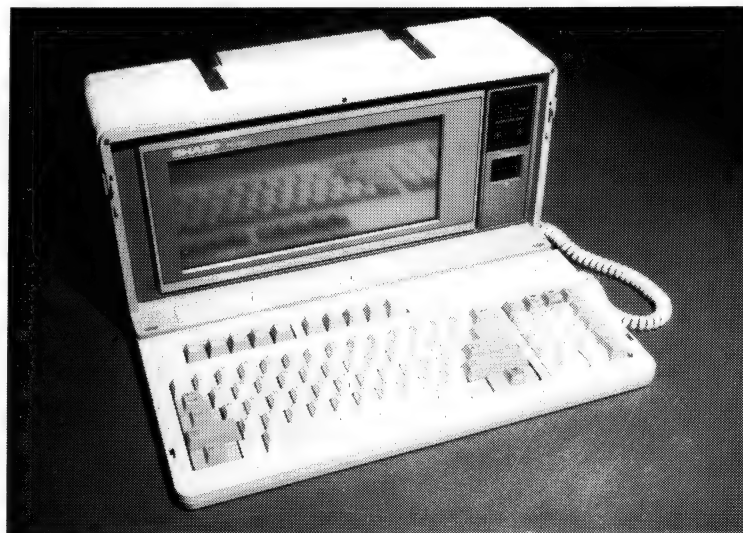
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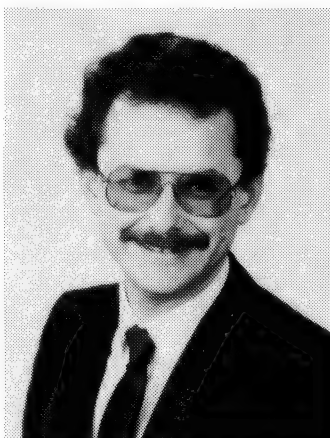
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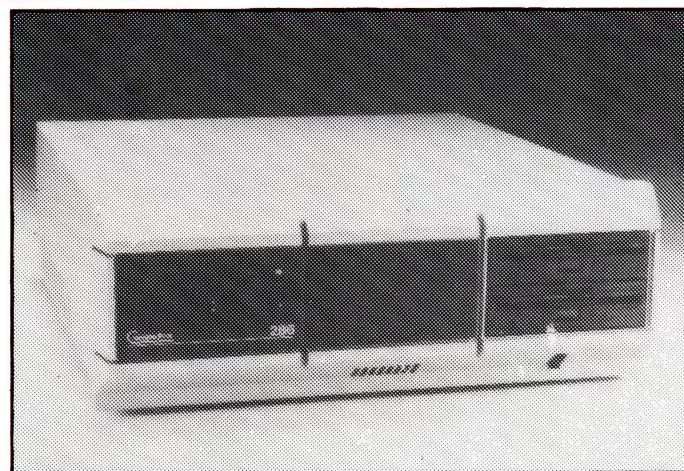
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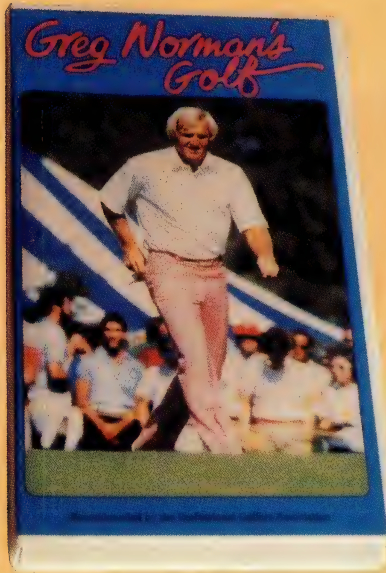
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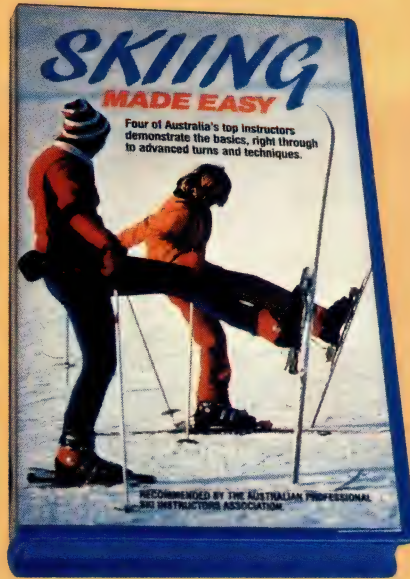
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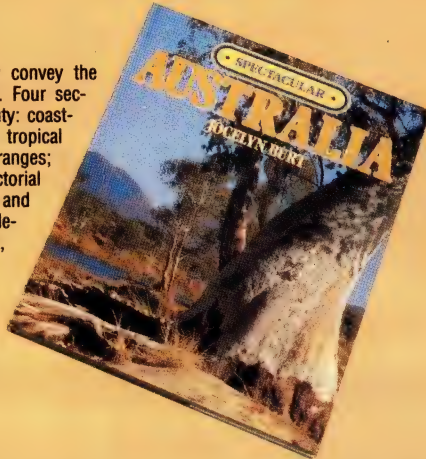


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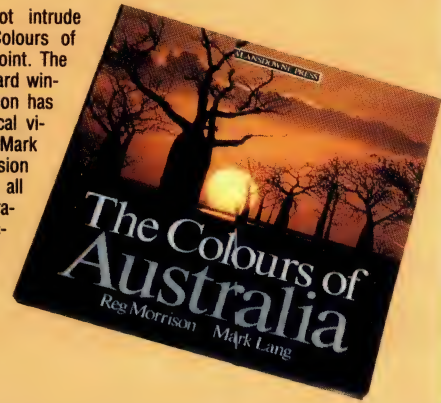


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ACCOUNTING ON THE ASCENT

After spending over 200 hours exploring the features of the Ascent Management Accounting software, Dan Lawrence, our resident Chartered Accountant, gives you the bottom line on how it adds up. Designed for larger businesses than those Padmede is aiming for, it also carries a considerably higher price tag.

The Ascent series of accounting modules is an Australian product designed and developed by Integrity Business Software. The company set out to create a group of modular programs which are as machine-independent as possible by using a high degree of parameter selection. The software is able to run on any video screen, can load programs from and process data on any drive selected, and can be used on either floppy or hard disk systems.

The main concept behind the Ascent series of accounting modules is that each program can be purchased and implemented separately as a single operating system. As a result, businesses can select only those modules, and features within them, which they initially require, and can add further options and modules when needed, without having to rekey data.

The software was first produced in 1982, with the latest patch implemented in 1985, the year it won an award for design

excellence from the Industrial Design Council of Australia. The New South Wales TAFE has selected it for use in its colleges, to provide students with hands-on data entry experience in computerised accounting.

Using operating systems such as PC/MS-DOS, CP/M80 and 86 and Concurrent DOS and PC-DOS, the software will run on over 250 makes and models of microcomputer, including IBM PC and compatibles, Compaq, Hewlett-Packard,

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Sharp, Altos, Digital and Televideo. While full integration is possible using twin floppies, a hard disk system is recommended for ease of use and operation. Greater speed and efficiency can be attained by using computers with faster microprocessors, such as the IBM AT and compatibles.

Features

The main modules of the system are Accounts Receivable, Inventory/Stock Control, Accounts Payable, Cashbook and General Ledger. Professional Time Costing (integratable) is also available, as is Payroll which is a standalone module. A core module can be acquired for as little as \$550.

The current version of the program is Ascent 3a, which has many new features, including two add-on modules: Reporter is used to design personalised output reports, while Breakaway can import and export data. The latter can convert file formats to those used by 99 per cent of other programs; for example, it can convert to ASCII, DIF and SYLK, with the ability to select data from specific fields and sort it into any required sequence. Data can be reworked prior to export, such as recalculating selling prices of stocks on hand.

The Ascent software is menu driven. The system menu allows selection of one of the main modules, and the resulting menu then provides the user with the program options applicable to that module, as well as allowing direct access to sub-programs in another modules for data inquiry, with automatic return (see Figure 1). The system is designed to provide maximum data integration by anchoring the Inventory module at one end and the General Ledger at the other end (see Figure 2).

Both Accounts Receivable and Payable have the facility to process customer and supplier invoices in standalone modules, while the former can generate sales invoices which are posted to customers' accounts. A tripartite integration with the Inventory/Stock Control module transfers the generation of sales invoices for products sold, together with the processing of invoices for goods purchased, to that program, with the immediate benefit of constantly upgrading stock levels as well as debtors' and creditors' accounts.

Speed of operation of the system is attained by using inter-program communications. Common variables allow parameters to be passed between modules, elimi-

nating the need to open and read parameter files each time a new program is loaded. Nine levels of password protection are available.

Menus used in all modules are uniform in character, and have clearly defined sections, with sub-programs for File Maintenance, Data Entry, Screen Enquiry, Reports, and Printouts which include mailing labels, collection letters, remittance advices, cheque printing, and stocktake update. Sundry facilities provide for end-of-period ageing and account file sort, as well as integration with such well-known

external packages as dBase II/III, Lotus 1-2-3, Wordstar, Multiplan, Open Access and others.

The hard copy reports produced by each module should satisfy the needs of the majority of business enterprises. Sales invoices and cheques can be spooled to disk for continuous printing. Reports can be printed on plain paper, on custom forms available from Moore Paragon, or on pre-printed stationery.

The Ascent series is a single-user system, which can set up accounting facilities for an unlimited number of companies

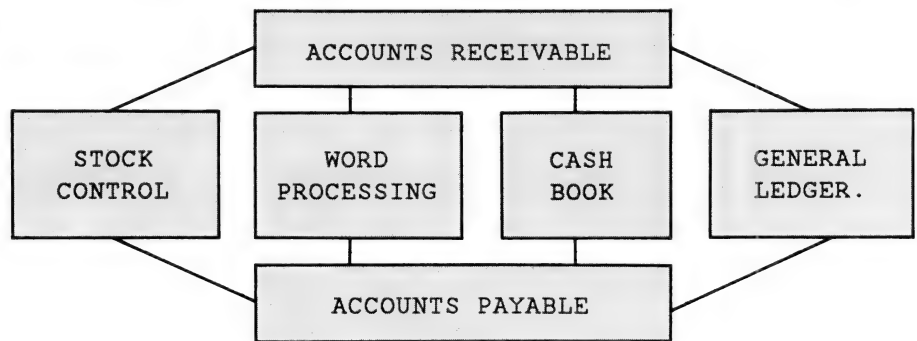


Figure 1. The Ascent Accounts Receivable Menu — Sub-programs in other modules can be accessed for data inquiry. ▽

Figure 2. The Ascent system modules — Stock Control anchors one end and the General Ledger the other. △

```

MENU ** ACCOUNTS RECEIVABLE ** A S C E N T / 3a          10/07/86

MAINTENANCE: 1. Reference Entry      REPORTS: 20. Transactions
              2. Account              21. Banking Slip
              3. -                    22. Salesman Analysis
              4. Sales Dissections    23. Commission Statement
              5. Salesman/Area        24. Sales Dissections
              6. Column Descriptors  25. Dissection History
              7. Letters/Statement Message 26. -
              8. -                    27. Account Details
              9. -                    28. Trial Balance
ENTRY: 10. Transactions              29. Account Sales Analysis
       11. Service Invoices/Credits 30. Statements
       12. Interest Charging        31. Mailing Labels
       13. -                        32. Collection Letters
       14. -                        33. -
ENQUIRY: 15. Account                OTHER: 34. End of Period Ageing
        16. Sales Dissection        35. Account File Sort
        17. -                      36. Verify Transaction File
        18. -                      37. Create W/Processing File
        19. -                      38. dBASE II Integration

SELECT: E.xit O.ther --/
  
```

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and businesses, as well as self-contained accounting for branches. The company provides a hotline for technical assistance in all mainland capital cities, and in Auckland, New Zealand, on a per annum cost of \$175 per module, with a maximum for all modules of \$550. Upgrade versions are 20 per cent of actual price to existing users, with no charge if purchased within the previous three months or if the user has a maintenance contract.

All operator errors result in beep warning signals, with error messages provided where necessary. Examples are invalid dates, incorrect field-data input, non-existent code numbers and wrong command procedures. Beep warning signals are also given when a customer credit limit is exceeded, when a payment is not fully allocated, and for unbalanced batches entered in the general ledger.

The LEARN facility is provided in the form of a macro in every module. It records a series of keystrokes in a nominated file, and will carry out a series of instructions which are automatically invoked by calling up the file. One valuable use for this is to record an end-of-month procedure which will print out a series of reports for consideration by various levels of management.

Default Features

One important measure of the quality of accounting software is the level of default characteristics which have been programmed into the system. Defaults represent numeric or string values which have been stored in registers or form part of the program. Default values are usually created when entering data for the first record processed, though some are recorded earlier, like setting the system date as a daily procedure. All defaults, including those representing commands, are activated by the RETURN/ENTER key.

Despite the fact that defaults maximise the utility of any computerised accounting system, they are rarely mentioned or adequately described in manuals. The obvious value of default features is the large volume of transactions which they allow to be processed with little effort, and the resulting reduction in labour cost.

The Ascent series of modules abounds with defaults which accelerate data entry and processing. This is especially so when using the Transaction Entry feature in both the Debtors and Creditors modules. To illustrate the point, when entering a

batch of invoices from the same supplier, after the first invoice has been processed, pressing the ENTER key at the appropriate times results in the automatic recording of the Creditor's name in full and indicates that an invoice is to be processed; and changing only the day component of the date will record day, month and year. Calling for a trial balance to be printed requires you to press the ENTER key successively to record the date of the report, start with the first account and end with the last, print in alphabetic order and print accounts with no balances. Changing these parameters is possible by keying in the desired data.

Default features also include use of the system date or last date entered, omitting cents for full dollar values and the automatic incrementing of sales invoices and cheque numbers. On any specific date, the program will calculate the cash discounts applicable and print the net amount payable on a creditor's cheque.

A feature called Alpha Search is another facet of default programming. Entering from one to five letters of a customer or supplier name in the account code area will result in a search for the appropriate account.

Accounts Receivable.

Subject to disk capacity, this module caters for up to 9,999 accounts, with 999 sales dissection codes. Open-item accounting to match cash receipts against specific invoices is available, in addition to the balance-forward method. Interest can be charged against outstanding balances, bank deposit slips can be generated from the Cash Receipts function and commissions can be calculated for payment to salespersons.

Accounts Payable

Only open-item accounting for payment of specific invoices is available, though disputed invoices can be held back. Cheques to suppliers can be produced, as can remittance advices. Payments for regular expenditure, such as rent, electricity, leasing and so on, can be made automatically.

Inventory/ Stock Control.

Stock account codes provide for 15 alphanumeric characters, while descriptions can have 28 characters, for up to 32,000 stock items, each with a back-order facility and a limit of three sales prices. Stock levels can be controlled. A sales history can be produced for any or all products, as well as for any or all customers. Sales and

purchase dissections are posted automatically to both the Accounts Receivable and Payable ledgers and, ultimately, to an integrated General Ledger. Forms can be printed for stocktake, and data entry of stock counts will update stock quantities. The system can produce a printout of quantity variances for investigation.

General Ledger

Multi-department accounts can be produced, together with consolidated results. Comparative figures are available for budget and previous year. The General Journal input is controlled by batch total, to ensure double entry is complete. Standing journal entries are automatically processed each month. On-line enquiries into general ledger accounts can be made. The standard chart of accounts is reasonably comprehensive and can be modified to suit the needs of most users.

Cashbook

In addition to providing details of cash receipts and payments, the current bank balance can be ascertained at any time, together with bank reconciliation reports.

Shortcomings

The automatic creation of customers' and suppliers' account numbers excludes the option of alphanumeric coding frequently used in practice. While this could be seen as a negative aspect of the system, accounts are easily located using the Alpha Search facility.

Details of Debtors' and Creditors' accounts are paginated into two screens: the first provides information on totals, while the second shows the details only of invoices, credit notes and journal adjustments. There is no option at the end of the second screen to return to the first. My memory having failed me at one such stage, I found I could not return to review totals owing, except via the menu. The system should provide the user with the facility of going either way.

The appearance of account numbers in the final accounts, shown in the sample provided by the developers, is disconcerting, as is the location of classifications in the Balance Sheet, which are printed over the comparative figures for the previous year. An option can be exercised to exclude the account numbers. Capital Reserves should be distinguished from Revenue Reserves, with appropriate headings and totals for each. Fixed Assets and Accumulated Depreciation are shown in one

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row without any net values. There is a definite need for improvement in presentation style, both here and in other parts of the Balance Sheet, as well as for an update of descriptions to currently used accounting terminology. Since the presentation of the final accounts is dependent on the way the chart of accounts is set up, almost all the failings I've raised can be adjusted without difficulty.

The major weakness of the system is in the content of the General Ledger Trial Balance. Prior to preparing monthly accounting reports for management, the trial balance must disclose whether all accruals, prepayments, expenses and income have been properly taken up. For this to be done, the trial balance must show, in respect of each account, from left to right, amounts for the opening balance, debit entry totals, credit entry totals, the net increase and decrease for the month and the cumulative total for the year to date. Only the last two are shown in Ascent's trial balance, which indicates the registers for the missing data actually exist. Come on, Integrity, why not give users what they need here!

Manuals

Each module has its own operator manual, divided into two main sections. Part one provides a system overview of the option facilities available, details of start-up procedures, password protection notes and a section on helpful hints. Part two explains the operation of each sub-program, and is adequate for a knowledgeable user. For a beginner, even with the mini-tutorial provided, it would be difficult to understand because of the technical nature of the explanations given.

Accounting Standards

A knowledgeable consultant could modify the Balance Sheet and Revenue Statements of Ascent to conform to the requirements of the Companies Code and the accounting standards of The Institute of Chartered Accountants in Australia. The facility provided by word processing makes it possible to provide Notes Attached to the Accounts, a necessary part of final accounting statements.

The package offers several methods of valuing stock on hand, including valuation by any one of three selling prices — this would be used only by management. The other methods are last purchase price, weighted average cost and moving average cost. Weighted average cost is used to

```

MENU ** PROFESSIONAL TIME COSTING  ASCENT / 3a  10/07/86

MAINTENANCE: 1. Reference Entry  REPORTS: 20. Client Summary
              2. Client          21. Employee Summary
              3. Employee        22. Function Summary
              4. Function        23. Job Sheet Summary
              5. Job Sheet      24. Batch List
              6. Section        25. Job Sheet Analysis
              7. Billing Details 26. Employee Analysis
              8. Column Descriptors
              9. -              27. Employee Transaction List
ENTRY:       10. Batch          28. Section Report
              11. Edit         29. Transaction Summary
              12. Update       30. Client Details
              13. Client Billing 31. -
              14. Write Up/Down 32. -
STATUS:      15. Client        33. -
              16. Employee      OTHER: 34. End of Period Processing
              17. Function      35. End of Year Processing
              18. Job Sheet     36. Recover/Sort Linked Files
              19. Section       37. Create Word Processing Files
SELECT:      E.xit O.ther  --/  38. Create Data Base Files
  
```

Figure 3. An integratable Professional Time Costing module is available for Ascent. Δ

Figure 4. Ascent's General Ledger menu. Note that the standard Chart of Accounts can be modified to suit individual needs. ∇

```

MENU ** GENERAL LEDGER  ASCENT / 3a  10/07/86

MAINTENANCE: 1. Reference Entry  REPORTS: 20. Batch File List
              2. Chart of Accounts 21. Transactions - Current
              3. Create Standard Chart
              4. Budget/Period      22. Transactions - Future
              5. Standing Journals  23. Standing Journals
              6. -                  24. -
              7. -                  25. Chart of Accounts
              8. -                  26. Private Ledger
BATCH:       9. Journal Entry      27. Budgets
              10. Standing Journals 28. Trial Balance
              11. Dissections Transfer
              12. Edit              29. Profit & Loss
              13. Update           30. Balance Sheet
              14. -                31. Comparative P & L
              15. -                32. -
ENQUIRY:     16. Private Ledger    33. -
              17. System Status    OTHER: 34. End of Period Ageing
              18. -                35. Chart of Accounts Sort
              19. -                36. MicroPlan Integration
SELECT:      E.xit O.ther  --/  37. -
                                   38. dBASE II Integration
  
```

INTERLINK VIATEL

INTERLINK VIATEL is a complete videotext package for the IBM PC and compatibles or the Apple II plus, Apple IIe or Apple IIc. **INTERLINK** will allow access to Viatel or any standard videotext based database service.

All versions include a telesoftware downloader facility for retrieval of data files and programs from Microtex 666 and other software services. Frames can be saved to disk as files and retrieved later. The lengthy I.D. code of Viatel can be automatically transmitted, leaving the user to enter only the PIN number.

Special symbols, including the complete Presetel character set, is implemented (with both flashing and reveal/conceal attributes). **INTERLINK** does not require a baud rate converter. It works equally well with "intelligent" Hayes type modems, or it can be used with conventional "dumb" modems. For computers that transmit or receive at 1200/1200 only, **INTERLINK** will compensate in software. **INTERLINK** is, best of all, extremely easy to use! One help menu tells you all you need to know about the program. Frames may also be dumped to printer for hard copy purposes.

IBM VERSION

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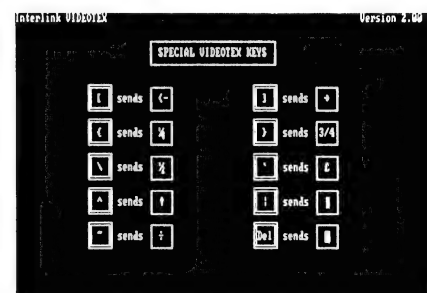
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value stocks held at the end of any financial accounting period, and would conform to the standards set by the Chartered Institute and be acceptable to the Australian Taxation Office. Last Purchase Price would only be acceptable in respect of those products where all the stocks at balance date had been purchased at that price. Moving Average is based on all costs incurred during the year and, generally, would be of use only to manage-ment.

Installation

All modules require parameters to be set for the specific needs individual businesses. As with most packages, user-installation is not recommended — it's worthwhile hiring a consultant, preferably someone familiar with the operation of the software system.

While the software is easy to use, the large number of data entry procedures available in a fully optioned system makes it desirable for staff to be taught the cor-

rect input routines, how to print reports, how to implement end-of-month ageing procedures, and so on.

This is definitely not a do-it-yourself package. It provides the user with a relatively sophisticated accounting system, limited only by its generality, an unavoidable characteristic of off-the-shelf programs. For a price, you can of course seek the services of a licensed programmer to tailor extra modules which will integrate with Ascent.

Transportability

Businesses which want to upgrade to Ascent, but are currently using another software package, will find that master files from other accounting systems can be converted into the Ascent format. If your business grows and you need more than one workstation, Ascent is also upgradable to Integrity's Horizon series of multi-user, multi-tasking software modules, through a conversion program which avoids the need to re-enter data. □

PRODUCT DETAILS

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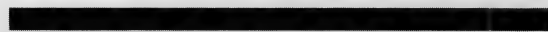
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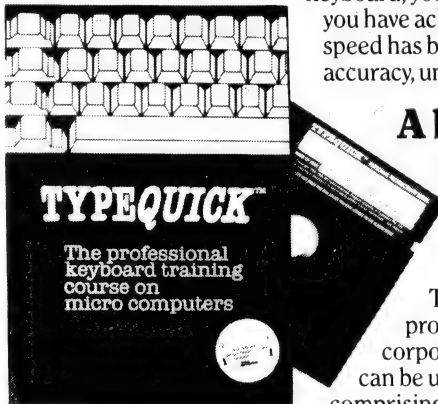


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POWER TO THE ACCOUNTANTS

For the third time in one issue, Dan Lawrence does his Account Dracula trick and extracts all the juicy bits from a popular number-crunching package. This time it's a high-powered system which can be tailored to meet the needs of virtually any business.

Power is an apt name for the computerised accounting system produced by Australian software developers, Power Software. Straight off the shelf, the main accounting modules appear to provide no more than what you would expect to get from any other accounting package. It is only when you dig below the surface that you discover this software is anything but a standard system. In Power, this company has created an applications generator which can produce a system tailored to the needs of virtually any enterprise.

Power is available for single- and multi-user applications. Each module can be purchased separately, and configured and installed to function as a standalone system. Additional modules can be acquired and integrated when needed. The software is competitively priced and will meet the needs of many types of business.

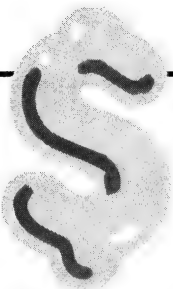
Prospective accounting-software buyers must usually balance the saving and convenience offered by off-the-shelf packages (compared with having a system custom-made) against the inability of most such systems to deal with the requirements of individual businesses. In the case of Power Software's modules, this is not a problem since they can be modified and tailored at any time after acquisition.

If you were to start with just one module, the logical selection would be the Trade Debtors ledger, which produces sales invoices, thus allowing you to concentrate on cash collections and improve liquidity. If you have many inventory lines, the second selection would be the Stock Control module, which integrates with the Debtors Ledger. Logically, the third module to acquire would be the Trade Creditors Ledger, accompanied by an optional program which allows invoices for goods

purchased to be processed in the Stock Module while updating inventory levels and recording the transactions in suppliers' accounts in the Creditors Ledger. The General Ledger completes the system, and includes a multiple cash book facility.

All the Power modules are menu driven, allowing users to proceed to sub-menus for Data Entry, Maintain Master Files/Enquiries, Report Printing, and Period End and Special Jobs. Screen displays and operator prompts are common throughout, and each module also has three levels of password which can be applied to each of the four main menu options (see Figure 1).

The Power Software range was designed specifically for Australian business conditions, and was first implemented on the 8-bit Commodore computer. It has since been re-designed and developed for use



Taking Care of Business

with 16-bit computers operating under PC/MS-DOS. Version 3 is the most current, and new Back Order modules for Debtors and Creditors are available. In coming months we'll also see the release of an integrated Payroll module.

While the software will run adequately with floppy disks, a hard disk allows true integration, with modules accessed through the main system menu. As I've pointed out before, to maximise speed of operations it's recommended that you run these kinds of packages on high-powered machines, such as the IBM AT and compatibles.

In addition to acting as subsidiary ledgers, the modules for Debtors, Creditors and Stock act as primary sources for recording data which is eventually transferred to the General Ledger, where the other primary data sources, in the form of General Journal and Cash Books, are found (see Figure 2).

Barry Barnes, the prime mover behind Power Software, says that in more than 80 per cent of installations, clients acquire a complete accounting system. Obviously, installing one module at a time and gradually building up to a complete system is a choice to be exercised by the buyer, who must decide how fast the software can be introduced into a particular business so as to cause little or no disruption.

The Force of Powercode

Powercode is a high-level fully interactive programming language with a configuration utility, used by licensed Power Software consultants to modify the basic modules to suit particular needs. It's like having a customised combination of dBase, Knowledgeman, Dataflex and Paradox. Power software can be configured to perform virtually any accounting task, such as Bill of Materials and Job Costing, without altering the basic program source

code. It can also be used to convert single-user software to multi-user status.

Do you want a database designed to link with any one (or more) of your debtors, creditors or inventory modules to serve as a source of data for management decision-making? At a recent two-day course, held to train consultants to use the Powercode configuration utility, I was shown how it could take just over one hour to link a simple database system to a Debtors module.

How about a second Debtors ledger which records data in a special way? Perhaps you have a business which charges monthly for standard and special services, and also charges interest on overdue amounts; if you require a Debtors ledger distinct in character from the one which records product sales to customers, Powercode can be used to produce it.

Powercode can cope with virtually any user requirement — for example, it is used to mimic specialised manual accounting systems, which may have been developed over a number of years. And the programming of such modifications appears to take a minimum amount of time (and cost!). Powercode sits inside the software and, being transparent to the user, can be used to provide your own customised features with the same style of user interface as offered by other Power modules, thus maintaining uniformity in the system.

Features

Standard screen presentation means certain features are available in all applications. A 12-hour clock, which shows either actual or elapsed time, is displayed in the bottom right-hand corner of the Footer area, while help messages may be invoked on the left-hand side. During any data-entry operation you can call up and use a simple calculator in the Footer area, and the results of these calculations can be transferred to the relevant data field.

User-definable function keys can be programmed to carry out various tasks. Keys F1 to F10 have been predefined to tasks such as calling the calculator, setting or clearing Tab positions on the screen, inserting or deleting lines of text, and providing for fast screen editing during data entry. Other functions can be assigned to shifted F1, F2 and so on, or to any key on the keyboard. An example would be to define a key as "Add New Stock Item" whenever you're processing invoices from suppliers. Pressing Control ▢

```
Registered User 'DRS Demonstration Only' S/N [KRXE] (Vs 3.0)
Debtors Wednesday 6/11/85

1 Data Entry
2 Maintain Master Files/Enquiries
3 Report Printing
4 Period End & Special Jobs

Choose One: 0

(999)=Password Entry (998)=Additional Function Key Definition 11:07:51
```

Figure 1. When the Debtors module is selected from the System menu, the Debtors system submenu appears.

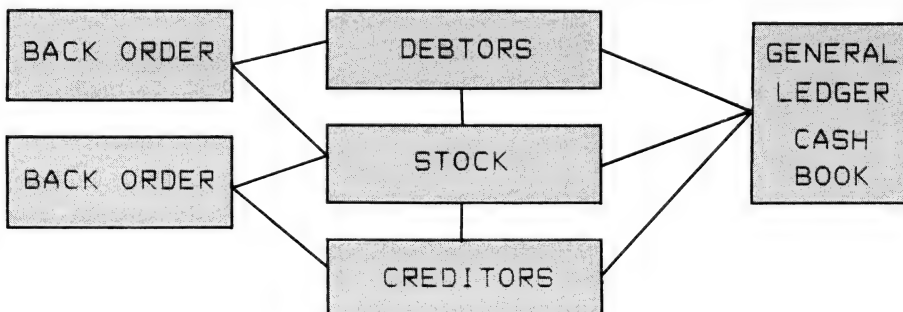


Figure 2. The Debtors, Stock and Creditors modules are the source of data that is transferred to the General Ledger.

Taking Care of Business

C stops the operation invoked by calling a special function.

Standard forms, such as invoices, monthly statements and remittance advices are designed to be printed on plain paper, with printer-formed horizontal and vertical lines. Since each module is provided with a report generator which can modify the design of standard management reports as well as output forms, the latter can be changed to retain the features which already exist in current manual systems. Thus, printouts can be designed to suit either standard, pre-printed forms or customised stationery. It is also possible to re-design data-entry screens.

Comments can be entered on sales invoices, using as many lines as required; and a simple word processing facility is available in each module to allow messages and letter text to be merged with selected master files. Sales invoices can be printed at the end of each batch, or stored in a file for printing at a later date. If, dur-

Powercode is a high-level fully interactive programming language with a configuration utility, used by licensed Power Software consultants to modify the program's basic modules to suit the precise accounting needs of business users.

ing printing, a paper jam or similar malfunction occurs, the affected invoices can be reprinted separately. The system can produce, among other kinds of printout, mailing labels and collection letters.

Account enquiries can be made on any master file, by account code, by alphabet code, by customer category code or by postcode. Transaction entry reports (audit trails) can be used to check the accuracy of data input. Data integrity is maintained whenever a record is opened, by having check bytes, at the accounting level, in the record layout of data. Cross-checks of totals are also made.

The Power system can be integrated with any other package which can read files in standard ASCII format, such as Lotus 1-2-3, Wordstar, Multiplan and Open Access.

Default Values

Power Software modules have many programmed defaults; in Debtors, for example, transaction entry defaults to raising sales invoices, and automatically increments invoice numbers. Other defaults select delivery name and address, unit sales prices, customer discounts and sales tax rates.

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ESSENTIAL DATA DUPLICATOR 4

Power Software can provide an option which allows the description and price of products sold to be read automatically from the Stock Module; the number of items available is shown on the screen prior to recording the quantity sold.

The Debtors Module

The standard system provides for open-item accounting to match specific invoices against cash receipts. The balance-forward method is available as an option. The module will maintain customer history records, and provide analyses of sales and product groups. The invoice displayed on the screen can be designed to match the printed version, and allows for multiple detail lines for data entry. It is possible to edit the data before printing.

Stock Control

Account codes are limited to 15 alphanumeric characters, but this can be extended to 20. Descriptions have a limit of 30 characters. Reports include a history of

Figure 3. The invoice displayed on the screen with Power can be designed to match existing, printed stationery.

Registered User 'DRS Demonstration Only'		S/N (KRXE) (Vs 3.0)	
Batch Invoicing for Client's Name		Tuesday 6/8/85	

Entry Number: 1	Account Balance: 74521.18
Total Value: .00	Credit Limit: 2000.00
(Fred Nurks Pty Limited)	Credit Remaining: -72521.18

Date	6/ 8/85
Reference	56762
Type	1 (Invoice)
Deliver to	Fred Nurks Pty Limited
Deliver Addr. Line 1	12 Railway Pde
Deliver addr. Line 2	Newtown NSW
Deliver addr. Line 3	
Customer order no.	BG87654
Despatched per	IPEC

30 Days 1:43:32

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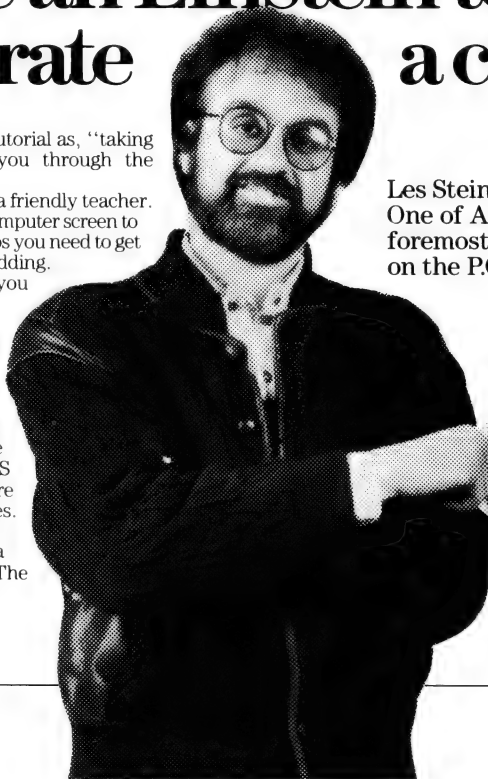


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stock items and stock movements, price lists and stock status, including details of current stocks on hand. A stocktake list can be printed to assist in physical counts. (The inclusion of a Stock Variance Report, to highlight differences for investigation, would enhance the system.)

Creditors

Open-item accounting is used to pay specific invoices, though any invoice can be held back from payment. Cash requirements can be forecast, with selection for early payment of invoices attracting cash discounts. The module will also produce remittance advices and cheques.

General Ledger

The inclusion of Cash Books in the General Ledger is significant, since receipts and payments are at the heart of every business, and are important as a source of basic accounting data. However, the Power system does not cater for bank reconciliation statements. The Charts of

Figure 4. Power's Single Line Stock Report shows stock status, including current stocks on hand.

Registered User 'STOCK Demonstration Only' S/N [OJEV] (Vs 3.0)
Stock Receipts for Client's Name Wednesday 2/10/85

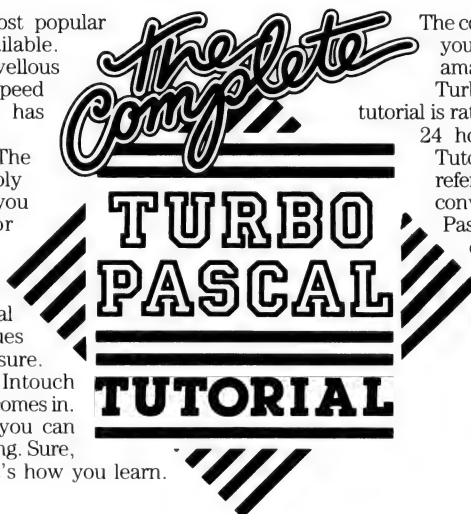
Stock Code:	P1014D	Desktop Calculator
[Entry No. 1]		
Quantity on Hand	-20	Value at Cost..... -4680.00
Unit Cost Price	234.00	Quantity on Order ... 0
Pricing Unit Descr. : ea		
Quantity Received....	12	
Total Cost.....	2808.00	Average Unit Cost \$234.00

Entry Complete : (RETURN)-ACCEPT OR (UP)-CHANGE ...

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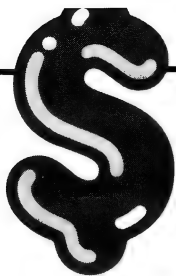
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Account are flexible enough to accommodate virtually any business enterprise.

The General Ledger module can account for multiple companies within one installation, without duplicating programs, and departmental accounting with separate reporting of trading results is available, as is any number of levels of consolidation.

The Manual

The manual contains descriptions of features and operating instructions for all modules in the system. The introduction contains many useful points, including how to set the system date and time; instructions for making back-up copies of floppy disks; an explanation of the possible causes of disk failure; how to set passwords; and detailed instructions for defining function keys.

Though the manual is written with the first-time user in mind and is easy to read, it would be a daunting task to try to operate the system with only the manual for company — some user training would save a lot of time and hair-tearing.

Accounting Standards

The model Balance Sheet and Revenue statements conform to the requirements of the Companies Code and the accounting standards of The Institute of Chartered Accountants in Australia. The system features Notes attached to the Accounts and separate detailed schedules of assets and liabilities, which is in line with modern presentation techniques. An adjustment to the Chart of Accounts would recognise the need to amortise Goodwill, as required by the Institute's Accounting Standard AAS 18.

There are two basic methods of valuing stock on hand. Last purchase price ignores the cost of previously acquired purchases, and could distort inventory values, depending on whether prices are increasing or decreasing. Average cost is based on the value of all stock acquired divided by all the quantity received and is a form of weighted average cost arrived at by means of a continuous calculation. As such, it conforms to the standards set by the Chartered Institute and would be acceptable to the Australian Taxation Office.

Installation

Like any other advanced-level accounting software, this is *not* a do-it-yourself system. The implementation of certain features requires the assistance of licensed

installers, who will remove unwanted menu selections and define keyboard layouts, choose screen colours and re-design the menu tree for individual terminals.

System Support

Support centres for Power software are to be found in Sydney, Melbourne, Adelaide and Young (NSW), and in Auckland and Wellington in New Zealand. Local support is available in other Australian capital cities and certain country centres. Depending on requirements, a complete support service, which includes installation, training and a phone hotline varies in cost from \$400 to \$700. Ongoing support costs are \$500 per annum, which covers 12 hours of service in areas such as installing upgrades, over-the-phone assistance or operator training. The charge for an upgrade version varies, depending on the number of modules in-

stalled, and costs from \$50 to \$100. It can be deducted from the \$500 support fee.

When the Chips are Down

On an off-the-shelf basis, Power Software is very good, but it scores very high ratings for the fact that it can be tailored to suit the needs of individual users.

If you are currently using another accounting software package and are considering a change, your data files can be ported over and converted to the Power Software format.

Whether you only want to buy a standard system, or if your needs go beyond an off-the-shelf requirement, it would seem that Power Software can accommodate you, and at a reasonable price. Those who require a tailored system will find that the cost of both hardware and customised software is well below a similar mini-computer system. □

PRODUCT DETAILS

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Supplier:

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Power Software,
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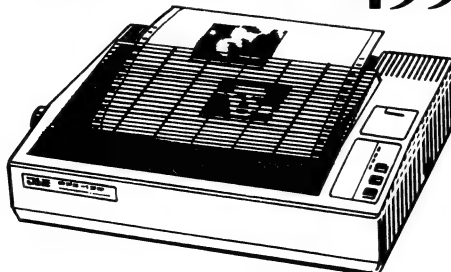
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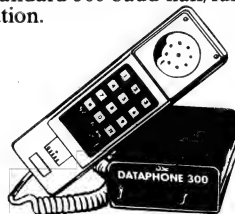
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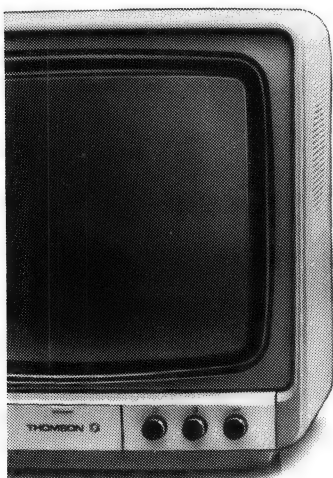
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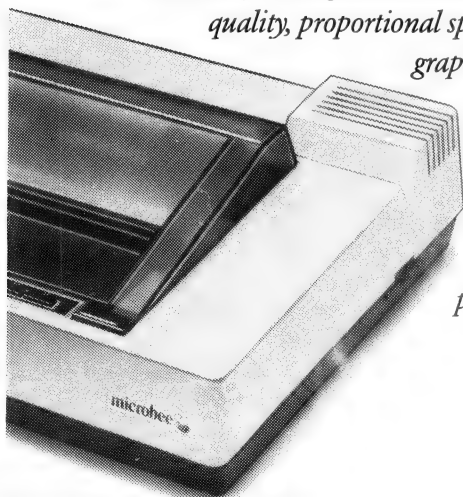
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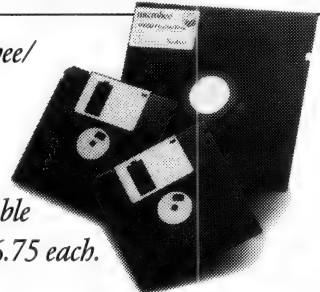


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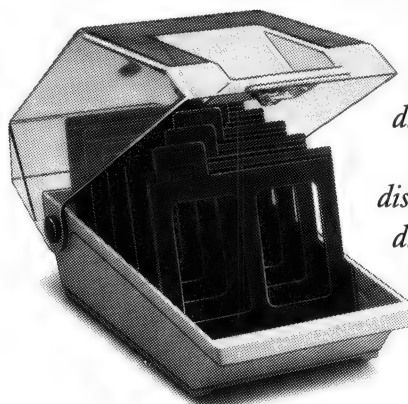
Very high quality, Microbee/Nashua 5.25 inch double-sided, double density 48 tpi diskettes... \$4.95 each.

3.5 inch single-sided, double density 135 tpi diskettes... \$6.75 each.



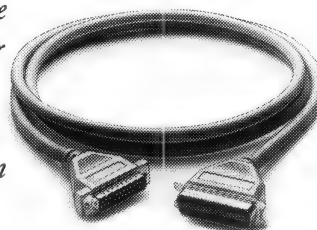
3.5 inch double-sided, double density 135 tpi diskettes... \$7.95 each.

Storage boxes for 50 diskettes, lockable, with dividers and smoked acrylic lid: For 5.25 inch diskettes... \$33.50. For 3.5 inch diskettes... \$35.00.



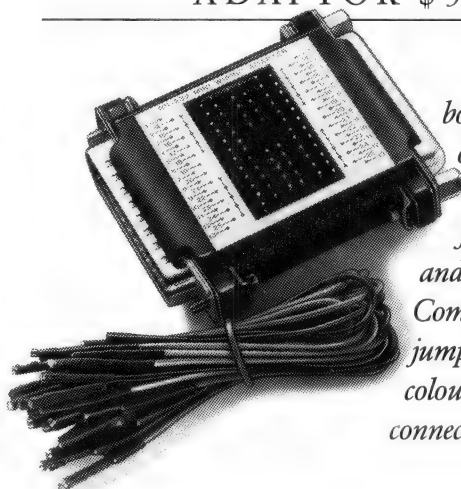
IBM-CENTRONICS PRINTER CABLE \$34.50

Connects an IBM PC or close compatible with a DB-25 printer socket to a standard Centronics-type parallel printer. Heavy duty cable, 6 feet long with moulded-on connectors.



RS-232C MINI WIRING ADAPTOR \$39.50

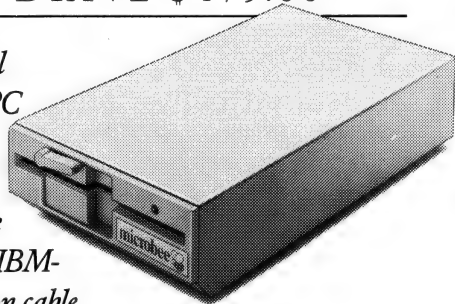
A mini "breakout box" that lets you try out any combination of serial connections, for trouble-shooting and custom interfacing. Comes complete with 25 jumper leads, in five colours. Male and female connectors.



COMPUTERS AND BUDGETS.

EXTERNAL IBM-TYPE 360K FLOPPY DRIVE \$475.00

Plugs into external drive socket on IBM PC or other close compatibles. Inbuilt power supply, comes complete with power cable and IBM-type 37-way connection cable.

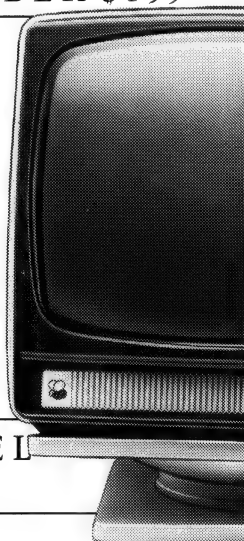


HI-RES GREEN MONO MONITOR \$299.00

Suitable for all computers needing a hi-res, 18.432 KHz separate-sync monochrome display (like our Gamma, IBM's monochrome or EGA adaptors, etc.) 25 MHz bandwidth, displays 80x25 lines. Accepts either TTL or analog input, has non-glare faceplate. Comes complete with video cable.

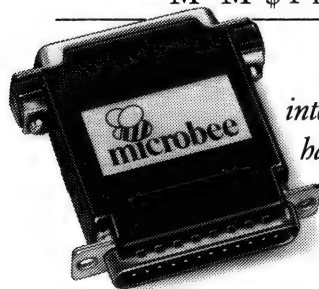
ECONOMY MONITOR GREEN \$149 AMBER \$159

Standard composite video input works with almost any computer. Crisp, easy-to-read display provided by 35 MHz bandwidth. Non-glare faceplate minimises eyestrain. Inbuilt 10 V/1.2 amp DC power output for powering a Microbee computer or other equipment.



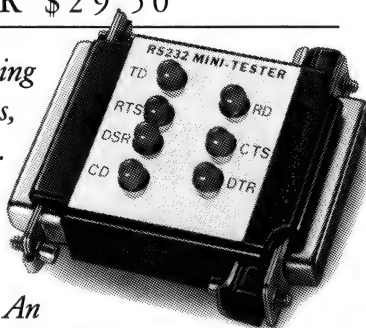
RS-232C GENDER CHANGERS M-M \$14.50 F-F \$14.95

Quick solutions to those RS-232C interfacing problems where your cable has a connector of the same gender as the equipment it must join. Low cost, but high quality.



RS-232C MINI TESTER \$29.50

Invaluable tool for tracking down problems with modems, terminals, serial printers, etc. LED indicators for all seven main signal and handshaking lines, both male and female connectors. An excellent companion for the Mini Wiring Adaptor.



MONITOR SWIVEL STAND \$24.50

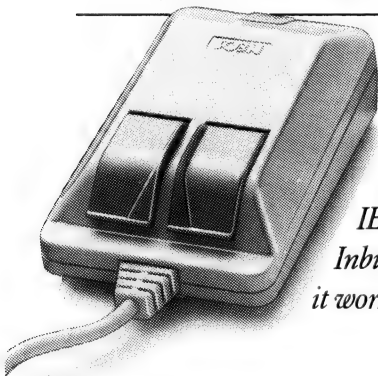
Raises your video monitor to a more convenient height, lets you adjust screen for the best viewing angle. Sturdy, suits most monitors.

BOXES OF PRINTER PAPER \$29.95

Box of 1000 sheets 210x280 mm (8.25x11 in) sprocket feed, fanfold paper, easily separated.

MICROSOFT COMPATIBLE SERIAL MOUSE \$149.00

Fully compatible with Microsoft's serial mouse and software, but much cheaper. Standard DB-25 connection for IBM PC or close compatibles. Inbuilt processor, teflon-coated ball so it works on almost any surface.



Sydney: Ryde (02) 886 4444 Waitara (02) 487 2711 Gosford (043) 24 2711
Canberra (062) 51 5883 Newcastle (049) 611 090 Melbourne (03) 817 1371
Brisbane (07) 394 3688 Adelaide (08) 212 3299 Perth (09) 386 8289
New Zealand: Auckland (09) 88 1138

Prices quoted are subject to change without notice.

 **microbee**
computer

NEED MORE WORD PROCESSING POWER FOR YOUR APPLE*? THEN CHOOSE



STEMWRITER

Check the following comparison of features, check the price, then call us!

Feature	Stemwriter	Appleworks	Zardax
On Screen:			
Underline	YES	NO	NO
Superscript	YES	NO	NO
Subscript	YES	NO	NO
Overstrike	YES	NO	NO
Bold	YES	NO	NO
Auxiliary			
Characters	YES	NO	NO
Horizontal Scrolling	YES	NO	NO
Split Screen Viewing	YES	NO	NO
Multiple Documents			
in Memory	YES	YES	NO
Column			
Copy/Move/Wipe	YES	NO	NO
Column Alignment	YES	NO	NO
Max size of			
Document in 128k			
Apple //	52k**	55k	30k
User Definable keys	YES	NO	YES
Word Search:			
Bounded	YES	NO	NO
Bi-directional	YES	NO	NO
Wildcard	YES	NO	NO
Form Letters	YES	NO	YES
Label Printing	YES	NO	NO
List Management:			
Mail	YES	NO	YES
Reference	YES	NO	NO
Standard			
Paragraphs	YES	NO	NO
Sort	YES	NO	YES***
Select	YES	NO	NO
Interactive page			
preview	YES	NO	NO
Hyphenation	YES	NO	NO
Footnotes	YES	NO	NO
Multi-column text	YES	NO	NO
Printing:			
Background	YES	NO	YES
Nominated Pages	YES	NO	NO
File Management:			
Automatic backup	YES	NO	NO
Encryption	YES	NO	NO
Capture Directory			
list	YES	NO	NO
Word Count	YES	NO	NO

* Apple //c, Apple //e with extended 80 col card, Apple ///

** Max size with RAM-disk 256k

*** Mail List only.

STEMSPELLER //

- * Automatically checks Stemwriter, Appleworks, Zardax, and ASCII files.
- * 30,000 word dictionary.
- * Ability to add a further 3000 words of your choice.
- * Requires only a single pass through a file.

STEMFONTS //

- * Allows you to design and download your own character sets to suitable dot matrix printers.
- * Permits you to match Stemwriter screen display to printer output.

ORDER FORM

ITEM	PRODUCT	QTY	SPECIAL PRICE	TOTAL
1	STEMWRITER // WORD PROCESSOR		\$130	
2	STEMSPELLER // SPELLING CHECKER		\$ 50	
3	STEMFONTS // FONT DESIGNER		\$ 30	
4	ITEMS 1 TO 3 INCLUSIVE		\$195	
5	STEMWRITER /// WORD PROCESSOR		\$130	
6	AIR FREIGHT		\$ 7	

TOTAL ORDER

NAME

ADDRESS: POSTCODE

☐ CHEQUE ☐ MONEY ORDER

☐ BANKCARD ☐ MASTERCARD



SIGNATURE EXPIRY DATE

POSTAL ADDRESS: **STEMSOFT, GPO BOX 1280** STREET ADDRESS: **31 CHISWICK RD, BARDON, QLD 4065**
BRISBANE, QLD 4001 **PHONE (07) 369 1515**

NOTE: THIS IS A SPECIAL OFFER AVAILABLE DIRECTLY FROM **STEMSOFT** ONLY. FREE BROCHURES AVAILABLE ON REQUEST. **APPLE** AND **APPLEWORKS** ARE REGISTERED TRADEMARKS OF APPLE. **ZARDAX** IS A REGISTERED TRADEMARK OF COMPUTER SOLUTIONS



On July 1 1986, Automation One acquired the distribution rights for CBA Accounting Software...(Intelligence Australia kept the hardware).

That represents good news for dealers and end-users alike.

Conceived as a joint-venture between Intelligence Australia and Cowan Bowman and Associates, Automation One will operate as a specialist software distributor.

Effectively clearing the way for a new range of quality Australian-made software to enter the market.

One such product being the A1 On-Line Support Pac for CBA

end-users. This package reduces downtime caused by technical malfunction to a matter of hours. With On-Line assistance you're sourcing the solution direct. That means no middlemen to slow you down.

So if you're a CBA end-user get on-the-line now, to your authorised CBA dealer.

It's a sound investment that will save you money.

 **Automation One**

27 Palmerston Crescent, South Melbourne, Victoria. Ph: **Melbourne (03) 699 7044**

Sydney (02) 387 7700 Brisbane (07) 844 2463 Perth (09) 322 4406

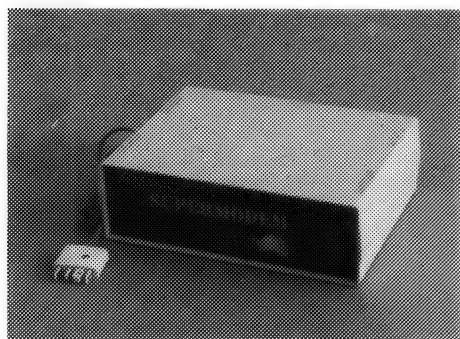
1200/75 BAUD SMART MODEM: \$395

A revolutionary, new, Australian-made modem for IBM, Apple IIc, etc.

"1200/75, 300 Baud full duplex, Hayes-compatible, auto-answer, auto-dial, auto-disconnect, auto-Baud rate select, auto-line turnaround, fully software controlled, VIATEL, RS232 connection, optional V.22 1200 Baud full duplex, mains powered, microprocessor controlled, intelligent standalone modem for IBM, Apple IIc, Macintosh, MicroBee and any computer with a serial port for under \$400....."

That was my shopping list when I went looking for a modem for my IBM. I needed a standalone modem that I could leave connected to the phone logging data while the IBM was disconnected, and that could be connected to a variety of other computers. And I didn't want to pay over \$1000.

A fully-featured RS232 modem for under \$400.



GPA Supermodem connects to phone and serial port

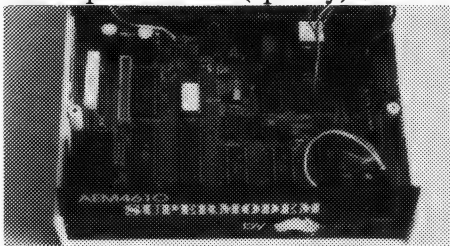
And, of course, by now you'll know that we built thousands and they have taken Australia by storm. Telecom, Westpac, CSIRO, UNSW are some of our larger customers. Their responses have been universally enthusiastic: "Fantastic! How did you do it for the price?" or "We want more of them. When will you have more stocks?" Some of our customers have bought up to 10 modems at a time!

For the first 3 months of production demand exceeded supply, but we have caught up now and SuperModems are now available ex stock. We have cables to suit most micros and can advise on the most suitable software for your computer. Viatel software is now available for the IBM and Apple IIe, IIc. Terminapple comms software to suit also available.

IN STOCK NOW

TECHNICAL FEATURES

- * Standalone, direct-connect serial modem
- * 6809 microprocessor controlled
- * Auto-answer, auto-dial, auto-disconnect, auto-line-turnaround
- * CCITT V21 and V23
- * V22 option, 1200 baud full dup available soon for \$160.
- * VIATEL software available \$25 (Apple/IBM)
- * Plugs into any serial port
- * Automatic Baud rate selection
- * Mains powered & onboard speaker
- * Meets Telecom approval specs
- * Fully software controllable
- * Internal expansion slot
- * Computer cables (specify) \$30



GPA Supermodem: Note V22 expansion socket

"That's all very well, but what do I DO with a modem?"

* **WORK FROM HOME:-** Interrogate your office computer. Send and receive messages, text for typesetting, price list updates, contracts, advertising drafts etc. Interrogate databases worldwide, e.g. MIDAS, DIALOG, LEXIS, MEDLINE etc.

* **RECREATION:-** VIATEL, BULLETIN BOARDS, USER GROUPS. etc.

* **VIATEL:-** Electronic mail, Instant telex at a fraction of the cost. Instant price updates as they occur on the stockmarket. Buy & sell. Home banking. Instant gambling on any race in Australia through VIATAB. Shop from home. Airline and hotel bookings. Home education courses.

The possibilities are limitless and exponentially expanding. The modem adds a third dimension to your computer that opens up as you explore it. You have to experience for yourself the magic of clicking between Sydney, Los Angeles, New York, Mexico City by modem.


Instantly, transparently and cheaply. Culling obscure facts. Interrogating mighty databases. Buying. Selling. Dazzling.

10 DAY FREE TRIAL

This really is a brilliant modem, but the only way you will ever find out for yourself is to order one. But you don't have to take my word for it. You can order a gpa SuperModem, try it out, and if it doesn't live up to your expectations send it back within a fortnight for a FULL REFUND. NO QUESTIONS ASKED. I could go on but the answer is to try it for yourself. We showed this ad to some of our best customers and they were sceptical that a \$395 modem could do everything we claimed. But when we loaned them a gpa SuperModem they were ECSTATIC. It really is that good.

TO ORDER: Ring me now on (049)26 4122 and quote your credit card number for overnight delivery. Or mail your cheque, purchase order or credit card number on the enclosed order form. Mail to Micro-Educational Pty Ltd, 8/235 Darby St NEWCASTLE 2300

ORDER FORM

 **MICRO-EDUCATIONAL**
8/235 Darby St
NEWCASTLE 2300

Dear George,

Please rush me _____

GPA SuperModem/s @ \$359 ex/ \$395 inc for my IBM PC/AppleIIc/Amiga/Mac/Bee OTHER _____ on 10 day approval. If I am not delighted with it I will send it back within a fortnight for a FULL REFUND. Other extras as follows:

☐ Cable \$30 ☐ Viatel s/w \$25

NAME: _____

ADDRESS: _____

P/CODE: _____

Enclosed please find cheque/ purchase order/ Bankcard/ VISA/ Mastercard # _____

for \$ _____

Add \$7 per modem for insured overnight KWIKASAIR courier.



MICRO-EDUCATIONAL PTY LTD
Australia's largest computer mail-order company

* VIATEL
49001 #

20,000 Customers buy disks from us. Why?

Sure we sell diskettes **cheaper** than anyone else. After all we sell a million disks a year so we can afford to keep prices low. But we also sell **top-quality** disks. US manufactured disks, machine-made using the very latest robot technology that ensures superb media quality, virtually nil reject rate, and the highest criteria testing in the industry. The formula for our success? Low price and convenience.

We're not just cheap. After 8 years in the direct-selling business we've turned phone order delivery into a fine art.

Try us out. Whatever you need for your computer, disks, paper, peripheral cards, printers, modems - we can supply. **Overnight.**

Away you go. Give me a call on **(049) 26 4122 for overnight delivery**

To tempt you I've organised a few **OCTOBER SPECIALS**. Now you could be forgiven for thinking there was some catch on these prices. After all they're about 50% cheaper than KMart or Dick Smith. But there's no catch. We rely on volume sales to get low prices from our suppliers and we like to think we run an efficient operation to keep your buy price down. And we team that recipe with reliable overnight delivery, intelligent phone advice and 10 day money-back and 6 months service warranties. So here goes:

DISKS \$1.50

That's why!

5.25 SSDD. \$1.40 in 100's. Amazing. And that price includes Sales Tax. Top quality, lifetime warranty, Micro-Ed logo made by Wabash US. Grab them NOW while they last!

FREE

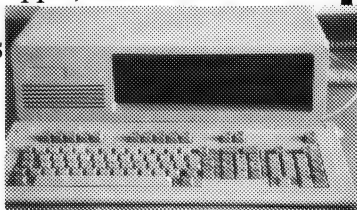
*LIBRARY DISK (IBM/Apple) orders over \$50
*Micro-Educational pen
*Newsletters and catalogs
plus you can

WIN

A Micro-Ed PC 640K, dual drive, monitor and full suite of DAC-Easy accounting software

Value \$2200!

Free entry with orders over \$20. Drawn Dec 19.



OCTOBER SPECIALS:

5.25" DSDD disks \$1.90ea/ \$1.80 in 100's
3.5" SS/DSDD disks \$5 ea/ \$4.50 in 100's
Library cases: \$2.50 ea. Disk sleeves: 12c ea
SWS 60 storage boxes: \$20
Super 5 TEAC Slimline drive IIe \$299

ORDER FORM -to: 8/235 Darby St NEWCASTLE 2300
Dear George, Please rush me the following:

by overnight courier (+\$7 courier charge). Enclosed please find cheque/ purchase order/ credit card #

----- for \$.....

Name:.....

Address:.....

Apple II

INVOICE SYSTEM

Invoice System, is a program I wrote to print invoices and maintain basic records of jobs I do on the weekend. As I am a full-time student, I could not afford a full-blown professional piece of software, so this is the rather simple system I came up with, which is quite sufficient for my needs, and those of a (very) small business.

The system has two files: SYSTM1, the main system; and SECSYST, a machine language security system. As soon as the SYSTM1 file is run, it loads SECSYST, disables the Reset key, and asks for a five-character password. The password can be reset by modifying lines 264 to 268, inclusive. These lines allow for both upper and lower case. If an incorrect character is typed, the bell sounds, and the system expects the password to be retyped from the start. If the correct password has not been entered after five attempts, the system jumps to SECSYST, which initiates a siren via the internal speaker, which can only be stopped by turning off the computer. If the

Reset key is pressed at any time while the program is running, SECSYST initiates the siren.

After the password has been entered, and the Return key pressed, the main menu appears. All menus in the system are driven the same way, namely: the arrow keys move the cursor up or down the list, and the Return key selects the desired option. Four options are given, Enter, Print, View, or Quit. Each of the first three options has its own submenu.

The Entry menu allows selection between a new or existing data file. If an existing file is chosen, the name of the file must be typed in. If CATALOG is entered rather than a filename, the catalogue is displayed, and the filename is asked for again. If 'new file' is selected, the system checks that a file of the same name does not already exist before creating it. If it does exist, a warning is given before the old file is erased. Data is stored in the random-access text file in 11 fields, including: Invoice Num-

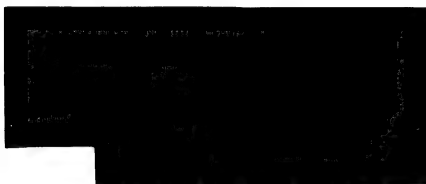
LIST

```

2 DIM DE$(11),IT$(10,4)
3 GOTO 258
4 HOME : PRINT " ELECTRICAL REC
ORDS & INVOICE SYSTEM"
5 PRINT " -----
-----"
6 POKE 34,3: HOME
7 PRINT " SYSTEM MAIN
MENU."
8 VTAB 13: PRINT " E
Enter Invoice:"
9 VTAB 15: PRINT " P
Print Invoice:"
10 VTAB 17: PRINT "
View Invoice:"
11 VTAB 19: PRINT "
Quit System:"
12 HT = 28:VT = 13
13 VTAB VT: HTAB HT: GET A$
14 IF ASC (A$) = 21 OR ASC (A$
) = 8 OR ASC (A$) = 13 THEN
POKE 49168,0: GOTO 16
15 GOTO 13
16 IF ASC (A$) = 21 THEN VT = V
T + 2: IF VT = 21 THEN VT =
1
17 IF ASC (A$) = 8 THEN VT = VT
- 2: IF VT = 11 THEN VT = 1
9
18 IF ASC (A$) < > 13 THEN 13
19 IF VT = 19 THEN POKE 34,0: HOME
: NEW
20 IF VT = 13 THEN 24
21 IF VT = 15 THEN FLAG = 1: GOTO
170
22 IF VT = 17 THEN FLAG = 0: GOTO
170
23 STOP
24 HOME : PRINT " E
NTRY MENU."
25 VTAB 13: PRINT "
New File:"
26 VTAB 15: PRINT "
Existing File:"
27 VTAB 17: PRINT "
Main Menu:"
28 HT = 28:VT = 13
29 HTAB HT: VTAB VT: GET A$
30 IF ASC (A$) = 21 OR ASC (A$
) = 8 OR ASC (A$) = 13 THEN
POKE 49168,0: GOTO 32
31 GOTO 29
32 IF ASC (A$) = 21 THEN VT = V
T + 2: IF VT = 19 THEN VT =
13
33 IF ASC (A$) = 8 THEN VT = VT
- 2: IF VT = 11 THEN VT = 1
7
34 IF ASC (A$) < > 13 THEN 29
35 IF VT = 17 THEN 6
36 IF VT = 13 THEN 39
37 IF VT = 15 THEN 61
38 STOP
39 VTAB 19: HTAB 15: INPUT "Name
of File:";NF$:NF$ = NF$ + "
"
40 HOME : PRINT " C
REATE FILE."
41 ONERR GOTO 49
42 PRINT CHR$(4) + "VERIFY";NF$
$
43 VTAB 10: PRINT " WARNING:
File ";NF$;" exists."
44 PRINT : PRINT
45 PRINT " This file will be era
sed in order to": PRINT "cre
ate a new ";NF$;" file.": PRINT
46 INPUT " Continue with Create
Option: (Y/N) ";A$:
47 IF A$ < > "Y" AND A$ < > "N
" THEN 24
48 GOTO 53
49 IF PEEK (222) < > 6 AND PEEK
(222) < > 11 AND PEEK (222
) < > 9 AND PEEK (222) < >
4 THEN PRINT "Error No. "; PEEK
(222): STOP
50 IF PEEK (222) = 11 THEN VTAB
15: PRINT "Bad File Name.": FOR
A = 1 TO 2500: NEXT A: GOTO
24

```

Our software makes your software smarter.



SMARTKEY

SmartKey does one thing. It lets you take any long, boring, repetitive or difficult-to-remember set of keystrokes and assign them to a single key. Sophisticated programs like Symphony give you a "macro" facility. SmartKey gives you macros for all your software in a single easy-to-use package. Any word, any line, any paragraph — even a whole page of "boilerplate" can be allocated to a single key and permanently saved. The uses of SmartKey are limited only by the imagination.

Available for IBM and compatibles (SmartKey 5.1), MS-DOS and CP/M-86 (SmartKey II Plus), CP/M-80 (SmartKey II). **Price: \$81*.**

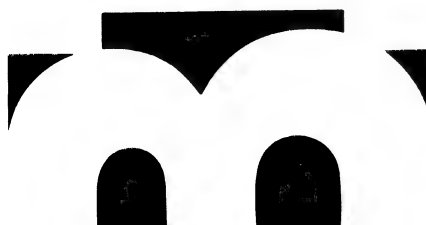


PC-ALIEN

An easy to use program that lets you read, write, and format disks from different CP/M and MSDOS machines! Speak to more than 220 other computers.

If the disk format you need to access is not included in the current menus in PC-Alien, just send us your formatted CP/M or MSDOS diskette containing more than 50% readable ASCII text and we will try to add that format to PC-Alien's comprehensive list.

With the appropriate hardware, PC-Alien will allow you to read 3.5 inch, 80 track and 8 inch formats in CP/M-80, 86 and MSDOS. Available for IBM and compatibles. **Price: \$104*.**



SMARTSTUFF

A collection of "pop up" desk tools which you can tailor to your needs. A full featured resident screen editor/notepad; A programmable calculator; A sophisticated financial calculator; A calendar alarm clock; A telephone dialer; A DOS menu which lets you use common DOS commands. Also includes a program which lets you interrupt an application, run any other program and then return to the application just where you left off.

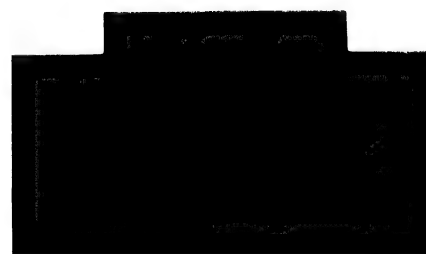
Available for IBM and compatibles. **Price: \$104*.**



SPATH

A terrific hard disk space-saver which eliminates the need for multiple copies of overlay and other program files on disk. Run any program that uses overlays, help, or other auxiliary files from any directory, sub-directory or disk drive. Group documents or data files into separate directories and subdirectories without keeping copies of your software on each one. SPATH is easy to use and once installed it may be autoloaded and forgotten.

Available for IBM and compatibles, other MS-DOS. **Price: \$33*.**



PC-EIGHTY

Don't throw away your old favourite CP/M-80 software! Now you can run it at full speed on your IBM-PC or compatible. By simply exchanging the 8088 CPU chip in your machine with the latest state-of-the-art NEC V20 chip you retain 100% compatibility with other hardware and software.

The V-20 also runs 8080 (not Z-80) code at full speed. With our PC-Eighty software, you can run your copy of CP/M version 2.2 as a task under DOS. With hard disk access, a half megabyte RAM disk and simultaneous use of DOS resident programs like SmartKey. Available for IBM and compatibles. **Price: \$140*.**

Software

Dealer inquiries welcome

* Allow \$5.00 additional postage charges



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TORRENS ACT 2607
or call (062) 86 1102

NAME _____

ADDRESS _____

P/CODE _____

Apple II

ber, Surname, Other Names, Address, Type of Job done, Date of Job, Invoice Total, and the date by which payment is Due. The system automatically assigns a reference number to each record, which consists of the record number in the text file, the first three letters of the surname, and the postcode. The contents of the reference number can be modified at line 99.

The Print option from the main menu asks for the data filename, in the same way as the Enter option (except that you can't create a new file). Once the file is entered, a blank entry-type screen is displayed, and you must select the search field (in the same way as if it were a menu). Once the field is selected, the search data is entered, and the appropriate record displayed. You then have the option of searching for a further record with the same search key, returning to the Print Menu, or printing the Invoice. Selecting 'Print' will require the input of an itemised list to be printed on the invoice, along with price per unit and number of units. The invoice total is calculated from this data,

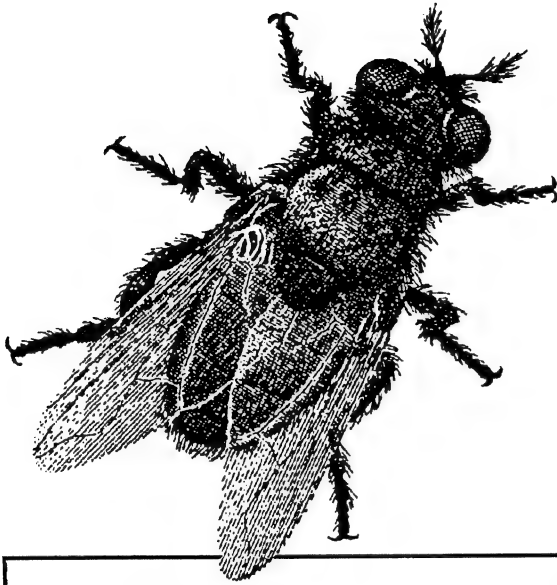
```

51 IF PEEK (222) = 9 THEN VTAB
15: PRINT "Disk Full.": FOR
A = 1 TO 2500: NEXT A: GOTO
24
52 IF PEEK (222) = 4 THEN VTAB
15: PRINT "Disk Write Protec
ted.": FOR A = 1 TO 2500: NEXT
A: GOTO 24
53 POKE 216,0
54 PRINT CHR$(4) + "OPEN";NF$
55 PRINT CHR$(4) + "DELETE";NF$
56 PRINT CHR$(4) + "OPEN";NF$;
",L30"
57 PRINT CHR$(4) + "WRITE";NF$;
",R0"
58 PRINT "0"
59 PRINT CHR$(4) + "CLOSE";NF$
60 GOTO 72
61 HOME : VTAB 10: INPUT " Name
of File:";NF$:NF$ = NF$ + "
"
62 IF NF$ < > "CATALOG" AND NF$
< > "Catalog" AND NF$ < >
"catalog" THEN 65
63 PRINT CHR$(4) + "CATALOG"
64 PRINT : INPUT " <Return> to C
ontinue";A$: GOTO 61
65 QNERR GOTO 67
66 GOTO 70
67 IF PEEK (222) < > 6 THEN PRINT
"Error No. "; PEEK (222): STOP
68 PRINT : PRINT "File ";NF$;" n
ot found.": FOR A = 1 TO 500
: NEXT A
69 POKE 216,0: GOTO 61
70 PRINT CHR$(4) + "VERIFY";NF$
71 POKE 216,0
72 HOME : PRINT "
ENTER DATA": POKE 34,4
73 VTAB 7: PRINT " Reference No:
"
74 PRINT " Invoice No:"
75 PRINT " Surname:"
76 PRINT " Other Names:"
77 PRINT " Street:"
78 PRINT " Suburb:"
79 PRINT " P/Code:"
80 PRINT " Type of Job:"
81 PRINT " Date of Job:"
82 PRINT "Invoice Total:"
83 PRINT " Due Date:"
84 VTAB 8: HTAB 15: INPUT " ";DE$
(2)
85 VTAB 9: HTAB 15: INPUT " ";DE$
(3)
86 VTAB 10: HTAB 15: INPUT " ";DE$
(4)
87 VTAB 11: HTAB 15: INPUT " ";DE$
(5)
88 VTAB 12: HTAB 15: INPUT " ";DE$
(6)
89 VTAB 13: HTAB 15: INPUT " ";DE$
(7)
90 VTAB 14: HTAB 15: INPUT " ";DE$
(8)
91 VTAB 15: HTAB 15: INPUT " ";DE$
(9)
92 VTAB 16: HTAB 15: INPUT " ";DE$
(10)
93 VTAB 17: HTAB 15: INPUT " ";DE$
(11)
94 PRINT CHR$(4) + "OPEN";NF$;
",L30"
95 PRINT CHR$(4) + "READ";NF$;
",R0"
96 INPUT NF
97 NR = NR + 1
98 PRINT CHR$(4) + "CLOSE";NF$
99 DE$(1) = STR$(NR) + LEFT$ (
DE$(3),3) + DE$(7)

```

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Apple II

and compared with the total given when the data was entered. The printed output from this section is formatted to fit onto Rediform R/295/IMS fanfold paper (carbonless triplicate).

The View option, functions almost exactly the same as the Print option, except the printed output is simply a screen dump of the basic data with no special formatting. The system uses the screen-dump codes for a Grap-per+ or compatible printer interface. To change to the codes for your interface, you will need to modify line 167.

To customise messages printed on the Invoice sheet, you will need to modify lines 218 to 223, 238 and 239. The Invoice System was written on an Apple II+ with lower-case modification, but should work on any of the Apple II family with little or no modification.

Glen Thornley,
MALVERN 5061.

```

100  VTAB 7: HTAB 15: PRINT DE$(1
101  VTAB 20: HTAB 5: INPUT "Is a
      11 data Connect? (Y/N) ":A$
      : IF A$ < > "Y" THEN 84
102  PRINT CHR$(4) + "OPEN":NF$
      : ",L30"
103  PRINT CHR$(4) + "WRITE":NF
      $: ",R0"
104  PRINT NR
105  FOR RN = ((NR * 11) - 10) TO
      (NR * 11)
106  PRINT CHR$(4) + "WRITE":NF
      $: ",R":RN
107  PRINT DE$(RN - ((NR - 1) * 1
      1))
108  NEXT RN
109  PRINT CHR$(4) + "CLOSE":NF
      $
110  POKE 34,3: GOTO 24
111  IF FLAG = 0 THEN POKE 34,3:
      HOME : PRINT "
      VIEW INVOICE": POKE 34,5
112  IF FLAG = 1 THEN POKE 34,3:
      HOME : PRINT "
      PRINT INVOICE": POKE 34,5
113  GOTO 171
114  VTAB 7: PRINT " REFERENCE NO
      : "
115  PRINT " INVOICE NO:"
116  PRINT " SURNAME:"
117  PRINT " OTHER NAMES:"
118  PRINT " STREET:"
119  PRINT " SUBURB:"
120  PRINT " P/CODE:"
121  PRINT " TYPE OF JOB:"
122  PRINT " DATE OF JOB:"
123  PRINT "INVOICE TOTAL:"
124  PRINT " DUE DATE:"
125  VT = 7: HT = 15
126  VTAB 19: PRINT " Select Se
      arch Key, then <RETURN>"
127  VTAB VT: HTAB HT: GET A$
128  IF ASC (A$) = 21 OR ASC (A
      $) = 8 OR ASC (A$) = 13 THEN
      POKE 49168,0: GOTO 130
129  GOTO 127
130  IF ASC (A$) = 21 THEN VT =
      VT + 1: IF VT = 18 THEN VT =
      7
131  IF ASC (A$) = 8 THEN VT = V
      T - 1: IF VT = 6 THEN VT = 1
      7
132  IF ASC (A$) < > 13 THEN 12
      7
133  VTAB VT: HTAB HT: PRINT "...
      ..... "
134  VTAB 19: PRINT " Enter the
      Search Data.
      "
135  VTAB VT: HTAB HT: INPUT "":D
      E$(0)
136  A = LEN (DE$(0)): VTAB VT: HTAB
      (15 + A): PRINT
137  SK = VT - 6: VTAB 21
138  PRINT CHR$(4) + "OPEN":NF$
      : ",L30"
139  PRINT CHR$(4) + "READ":NF$
      : ",R0"
140  INPUT NR
141  PRINT CHR$(4) + "CLOSE":NF
      $
142  IF SK = 1 AND VAL (DE$(0)) <
      = NR THEN RN = VAL (DE$(0)
      ): GOTO 154
143  IF SK = 1 AND VAL (DE$(0)) >
      NR THEN VTAB 20: PRINT "Inc
      orrect Reference Number": GOTO
      133
144  RN = 1
145  IF RN > NR THEN 153
146  PRINT CHR$(4) + "OPEN":NF$
      : ",L30"
147  PRINT CHR$(4) + "READ":NF$
      : ",R":(RN * 11) - (11 - SK)
148  INPUT DE$(SK)
149  IF DE$(0) < > DE$(SK) THEN
      RN = RN + 1
150  IF DE$(0) = DE$(SK) THEN 154
151  IF RN < = NR THEN 147
152  IF RN > NR THEN 153
153  PRINT CHR$(4) + "CLOSE":NF
      $: POKE 34,18: HOME : POKE 3
      4,5: VTAB 19: PRINT "That's
      all of them. <RETURN> to Con
      tinue": INPUT "":A$: GOTO 11
      1
154  PRINT CHR$(4) + "OPEN":NF$
      : ",L30"
155  FOR X = ((RN * 11) - 10) TO
      (RN * 11)
156  PRINT CHR$(4) + "READ":NF$
      : ",R":X
157  INPUT DE$(X - ((RN - 1) * 11
      ))
158  NEXT X
159  PRINT CHR$(4) + "CLOSE":NF
      $
160  FOR VT = 7 TO 17
161  VTAB VT: HTAB 15: PRINT DE$(
      VT - 6)
162  NEXT VT: POKE 34,18: HOME : POKE
      34,5
163  VTAB 19: HTAB 1: PRINT "-> T
      O CONT. SEARCH: <P> TO PRINT
      SCREEN": PRINT " OR <RETU
      RN> FOR MENU": GET Z$: IF ASC
      (Z$) < > 21 AND ASC (Z$) <
      > 80 AND ASC (Z$) < > 13 THEN
      POKE 49168,0: GOTO 163
164  POKE 49168,0: PRINT
165  IF Z$ = CHR$(13) THEN 111
166  IF Z$ = CHR$(80) THEN GOSUB
      194
167  IF Z$ = CHR$(80) THEN PR#
      1: PRINT CHR$(9): "S": PR#
      0: GOTO 163

```

POCKET PROGRAMS

Apple II

```

168 IF Z$ = CHR$(21) THEN RN =
    RN + 1: IF RN < = NR THEN 1
    46
169 GOTO 152
170 GOTO 111
171 VTAB 13: PRINT "
    View Invoice:"
172 VTAB 15: PRINT "
    Main Menu:"
173 HT = 28: VT = 13
174 HTAB HT: VTAB VT: GET A$
175 IF ASC(A$) = 21 OR ASC(A
    $) = 8 OR ASC(A$) = 13 THEN
    POKE 49168,0: GOTO 177
176 GOTO 174
177 IF ASC(A$) = 21 THEN VT =
    VT + 2: IF VT = 17 THEN VT =
    13
178 GOTO 189
179 IF NF$ < > "CATALOG" AND NF
    $ < > "Catalog" AND NF$ < >
    "catalog" THEN 182
180 PRINT CHR$(4) + "CATALOG"
181 PRINT : INPUT " (Return) to
    Continue"; A$: HOME : GOTO 19
    2
182 ONERR GOTO 184
183 GOTO 187
184 IF PEEK(222) < > 6 AND PEEK
    (222) < > 11 THEN PRINT "E
    rror No. "; PEEK(222): STOP

185 IF PEEK(222) = 11 THEN VTAB
    19: PRINT " Bad File Name"
    : FOR Z = 1 TO 2500: NEXT Z:
    POKE 216,0: GOTO 111
186 PRINT : PRINT "File "; NF$:
    not found.": FOR A = 1 TO 25
    00: NEXT A: POKE 216,0: GOTO
    111
187 PRINT CHR$(4) + "VERIFY"; N
    F$
188 POKE 216,0: HOME : GOTO 114
189 IF ASC(A$) = 8 THEN VT = V
    T - 2: IF VT = 11 THEN VT =
    15
190 IF ASC(A$) < > 13 THEN 17
    4
191 IF VT = 15 THEN POKE 34,3: GOTO
    6
192 VTAB 17: HTAB 12: INPUT "Ent
    er File Name:"; NF$: NF$ = NF$
    + ""
193 GOTO 179
194 IF FLAG = 0 THEN RETURN
195 POP : POKE 34,18: HOME
196 INPUT "Enter Number of Items
    to be Invoiced:"; IN: IF IN >
    10 THEN PRINT "Ten Items Ma
    ximum.": VTAB 20: GOTO 196
197 FOR Q = 1 TO IN
198 HOME : PRINT "Enter Item "; Q
    ; " Description."
199 INPUT " "; IT$(Q,1): IF LEN(
    IT$(Q,1)) > 39 THEN PRINT "
    Too Long. 39 Chars Maximum."
    : FOR A = 1 TO 2000: NEXT A:
    GOTO 198
200 HOME : PRINT "Enter Price pe
    r Unit for Item "; Q
201 INPUT " "; D$: GOSUB 245: IT$(
    Q,2) = D$
202 HOME : PRINT "Enter Number o
    f Units of Item "; Q
203 INPUT " "; IT$(Q,3)
204 D$ = STR$(VAL(IT$(Q,2)) *
    VAL(IT$(Q,3))): GOSUB 245:
    IT$(Q,4) = D$
205 NEXT Q
206 M = 0
207 FOR Q = 1 TO IN
208 M = M + VAL(IT$(Q,4)): NEXT
    Q
209 IF M < > VAL(DE$(10)) THEN
    HOME : PRINT "Calculated In
    voice Total does not match T
    otal from "; NF$: " File."
210 INPUT "<C>ontinue or <R>e-En
    ter "; Z$: IF ASC(Z$) = 82
    OR ASC(Z$) = 114 THEN 197
211 IF ASC(Z$) = 67 OR ASC(Z
    $) = 99 THEN 213
212 PRINT " ": GOTO 209
213 HOME : PRINT "Enter Today's
    Date"
214 INPUT " "; TD$: IF LEN(TD$) >
    19 THEN PRINT "Too Long. 19
    Chars. Maximum": FOR Z = 1 TO
    2000: NEXT Z: GOTO 213
215 HOME : VTAB 23: PRINT "
    PRINTING INVOICE"
216 PR# 1
217 PRINT CHR$(9); "80N"
218 PRINT " GLEN THORNLEY"; SPC(
    30); "Reference No "; DE$(1)
219 PRINT " Appliance Repair
    , and"
220 PRINT " Minor Electrical
    ."
221 PRINT SPC(50); "Invoice No
    "; DE$(2)
222 PRINT " 111 2222"
223 PRINT " 333 4444 After H
    ours"
224 PRINT SPC(62); TD$
225 PRINT : PRINT : PRINT : PRINT
    : PRINT
226 PRINT SPC(10); DE$(4); " "; D
    E$(3)
227 PRINT SPC(10); DE$(5)
228 PRINT SPC(10); DE$(6); "
    "; DE$(7)
229 PRINT : PRINT
230 PRINT SPC(10); DE$(8)
231 PRINT : PRINT : PRINT : PRINT
    : PRINT

```



Apple II

```

232 PRINT SPC( 14);"DESCRIPTION
"; SPC( 18);"COST EA"; SPC(
6);"UNITS"; SPC( 8);"TOTAL"
233 PRINT : PRINT : PRINT : PRINT

234 FOR Q = 1 TO IN
PRINT IT$(Q,1); SPC( 41 - LEN
(IT$(Q,1))) + (11 - LEN (IT
$(Q,2)));IT$(Q,2); SPC( 2 +
(6 - LEN (IT$(Q,3)));IT$(Q
,3); SPC( 2 + (17 - ( LEN (I
T$(Q,4))));"$";IT$(Q,4)
236 NEXT Q
237 FOR Z = 1 TO (22 - (2 * Q));
PRINT : NEXT Z
238 PRINT : PRINT : PRINT : PRINT
"Post Payment to: 1 Main St.
, MYTOWN, 9999."
239 PRINT : PRINT : PRINT : PRINT
"NOTE: Tax is Pre-Payed. T
erms are 14 Days Net."
240 G = 0: FOR Q = 1 TO IN:G = G +
VAL (IT$(Q,4)): NEXT Q:D$ =
STR$(G): GOSUB 245:TD$ = D
$
241 PRINT : PRINT SPC( 51 - ( LEN
(DE$(11)))):"TOTAL DUE ":DE$
(11): SPC( 1 + (17 - ( LEN (
TD$)))):"$":TD$
242 PR# 0
243 POKE 34,3
244 GOTO 111
245 E = VAL (D$)
246 IF E = INT (E) THEN D$ = D$
+ ".00": RETURN
247 IF E = ( INT (E * 4) / 10) THEN
D$ = D$ + "0": GOSUB 250: RETURN
248 IF E = ( INT (E * 16) / 100)
THEN RETURN
249 D$ = STR$( INT (E * 16) / 1
00): RETURN
250 IF VAL (D$) = E THEN RETURN
251 IF VAL (D$) < E THEN 252

252 V$ = RIGHT$(D$,2):L = VAL
( LEFT$(V$,1)):L = L + 1
253 J = VAL (D$):J = J + .01:D$ =
STR$(J): RETURN
254 J = VAL (D$):J = J - .01:D$ =
STR$(J): RETURN
255 V$ = RIGHT$(D$,2):L = VAL
( LEFT$(V$,1)):L = L + 1
256 D$ = LEFT$(D$, ( LEN (D$) -
2)):D$ = D$ + STR$(L) + "0
"
257 PRINT ": RETURN
258 PRINT CHR$( 4) + "BLOADSECS
YST": POKE 1010,0: POKE 1011
,3: POKE 1012,166
259 UNERR GOTO 272
260 G = 1
261 F = 1
262 HOME : VTAB 14: HTAB 6: PRINT
"Enter Password:";
263 GET A$
264 IF F = 1 AND (A$ = "A" OR A$
= "a") THEN F = F + 1: GOTO
262
265 IF F = 2 AND (A$ = "B" OR A$
= "b") THEN F = F + 1: GOTO
262
266 IF F = 3 AND (A$ = "C" OR A$
= "c") THEN F = F + 1: GOTO
262
267 IF F = 4 AND (A$ = "D" OR A$
= "d") THEN F = F + 1: GOTO
262
268 IF F = 5 AND (A$ = "E" OR A$
= "e") THEN F = F + 1: GOTO
262
269 IF F = 6 AND A$ = CHR$( 13)
THEN POKE 216,0: GOTO 4
270 IF G > = 5 THEN HOME : CALL
768
271 G = G + 1: PRINT CHR$( 7): GOTO
261
272 HOME : CALL 768

```

1

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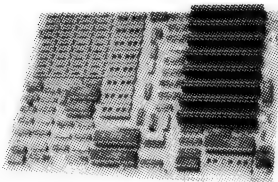
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- Hercules compatible
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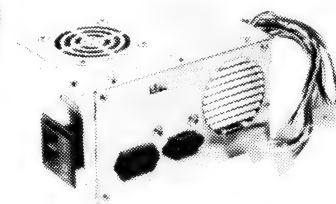
- Controls 4 DS/DD 360KB drives

\$65

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- Independent receiver clock input
- 2nd serial port optional
- Full buffering eliminates need for precise synchronization

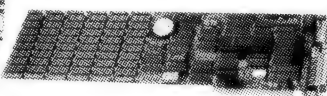
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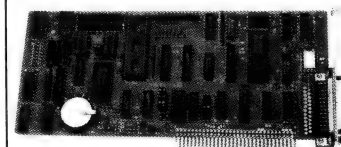
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- Floppy disk adapter, drives 2 DS/DD floppy drives
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- 1 parallel port, 1 joystick port
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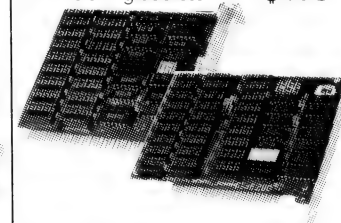
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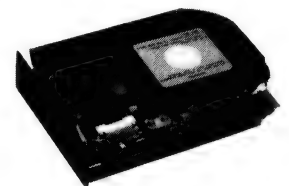
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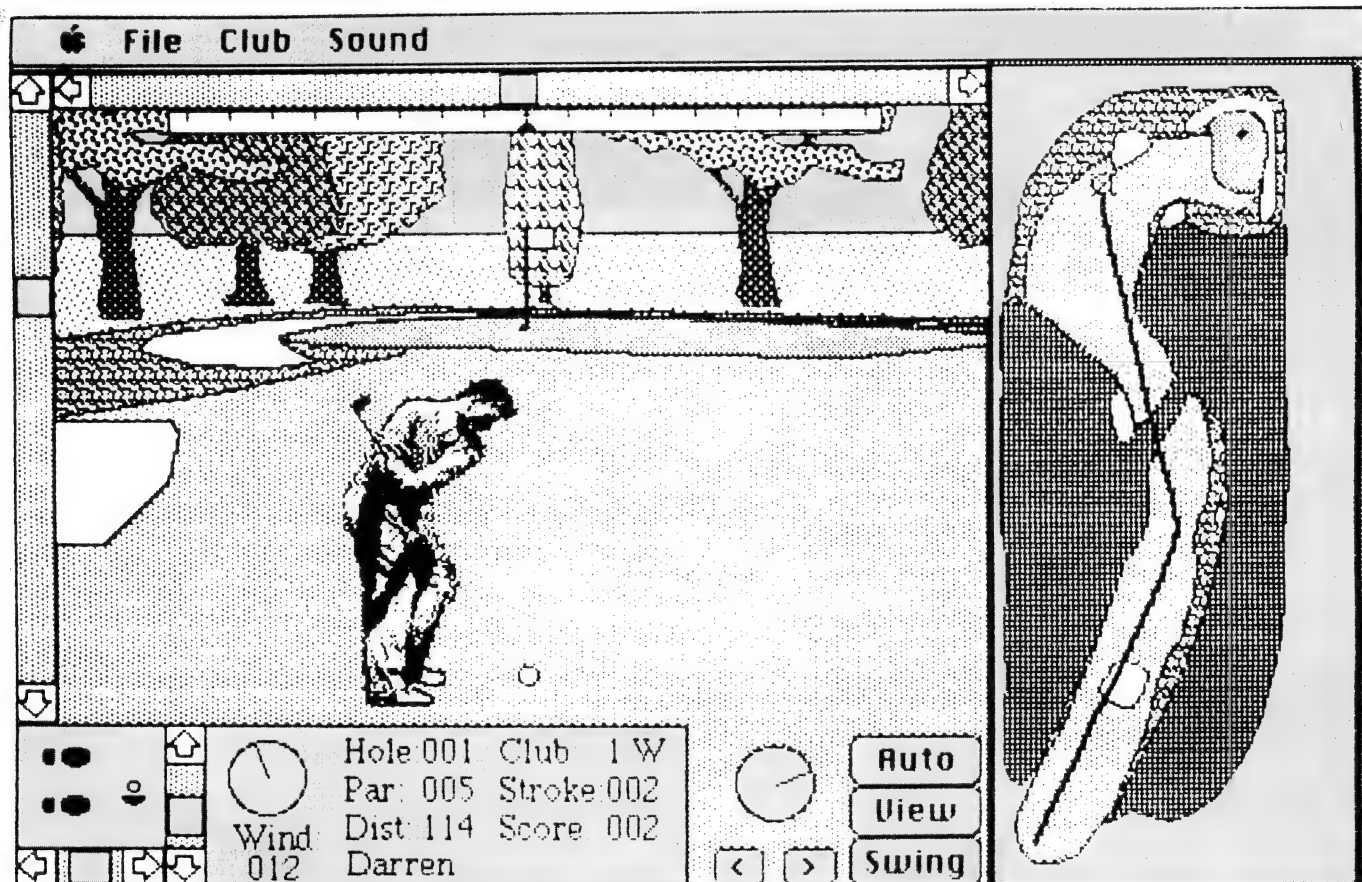
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MacGOLF — WATCH THE BIRDIE



Rising from the office swamp is an oasis of green, a lunchtime retreat for the hard-working MacUser. Darren Challis putt MacGolf to the tournament (just testing, tee hee).

THE MACINTOSH is regarded in many circles as a computer for businesspeople, but even businesspeople need some relaxation, and if you're not the sort who gets to indulge in a long lunch followed by a relaxing round of golf every second day ... may we suggest a chicken-lettuce-and-mayonnaise sandwich, a bottle of mineral water and a quick round on the Mac. MacGolf is the game, Practical Computer Applications is the name of the company that came up with the idea guaranteed to win fame in Japan.

As the name suggests, MacGolf simulates the clubbing of a tiny white ball around a strategically undulating lawn dotted with flags on poles and elusive holes — a pursuit which has its origins in

the Roman game paganica

If you've ever played golf, you should have no problem adjusting to this computer version. For newcomers to the game MacGolf offers an easy way in which to learn many of the fundamentals, in the comfort of your own office. However, unlike flight simulators, which almost teach you how to fly planes, MacGolf won't teach you how to hold a club and hit the ball.

The Screen Scene

There are two main parts to the MacGolf screen. On the right is the 'Map Window', the aerial view of the hole being played. It shows you where the fairway, green, hole, rough, water and sand-bunkers are, as well

as the path your ball has travelled during the entire hole. The 'View Window' occupies most of the screen, and allows you to look at yourself and the course in true perspective. Trees line the fairway in this view, but they don't serve as obstacles — they merely exist to add to the feeling of perspective and reality. The drawing of the scene is relatively slow, and this is perhaps one of the greatest problems of MacGolf. Nevertheless, the computer game is faster to play than the real thing.

The player has full control over his or her shots. You must determine what angle you wish to face, which of the 14 clubs to use and the amount of power with which to strike the ball. You also have the ability to make the ball hook (to the left) or fade (to the right), in order to compensate for the wind. The wind speed and wind direction are random, but remain constant for your entire hole. Everything is controlled with the mouse; for example, you select your club from a pull-down menu.

Up to four players can play MacGolf simultaneously, each at a different skill level, if desired. You can also choose between two different 18-hole courses. Disks containing extra courses for MacGolf are promised by its publishers.

Tee Time

After entering the player names and skill levels and choosing between the courses, the first player (go on, you first — don't be a chicken, be a birdie) is ready to tee off! The Map Window is drawn, but the View Window is left blank. You must select the direction in which you wish to face — the program automatically tries to face you toward the hole, but the placing of various obstacles can render a direct path unsuitable.

Pressing the 'View' button summons the scene to the screen. You can still change the view before you swing, and you also have to position your feet (using a scroll-bar) so that the ball will hook or fade. Another scroll-bar controls how much force you will strike the ball with.

When all variables have been taken into account, you press the 'Swing' button, which jolts the player on the screen into an animated display of hitting the ball. A black line is drawn on the Map Window, tracing the path your ball followed. The ball will also re-appear on the View Window, falling from the sky, and bouncing on every surface except sand or water. If your ball lands out-of-bounds, you get another shot.

The next player is the one furthest from the hole.

When the ball lands on the green, the computer automatically removes the flag from the hole and selects a putter for the player. Putting works similarly to hitting. However, the variables of wind and wind direction now become variations in the grass and slope of the green. Putting is not easy. A ball can roll over the hole, without going in, if you hit it too hard.

Bonk, Thud, Rattle, Plonk

One of the best features of the game is its digitised sound, which was produced using the excellent MacNifty Audio Digitiser (distributed in Australia by InfoMagic). When you hit the ball, you can really hear it being hit; when a ball goes out-of-bounds the computer's comment is "Oops!"; balls hit the water with a 'splash' and they hit the sand with a muffled thud; you even hear the ball landing in the hole. If you have an excellent putt, you are rewarded by a cheer from the crowd, but a narrow miss will bring the crowd to cry "Oohh!" in despair. And when you start the disk, the computer yells "Fore!" to set the atmosphere.

Unfortunately MacGolf won't work on a 128 Kbyte Mac, but only on a 512 Kbyte system or on the Macintosh Plus. The game's worst aspect is its heavy copy-protection. Ironically, the only other program published by Practical Computer Applications for the Mac, when we went to press, was MacBackup, a copy program.

Despite this handicap, MacGolf is excellent fun. I've never achieved par in the real game of golf, but on the Mac I usually come close and occasionally hit on par. It would add to the game if you were able to set more parameters than just the skill level; or if you could choose from the skills of famous golfers. It would also be nice to be able to save an incomplete game so that you could return to it; but the 400 Kbyte disk is already full, even without a Finder. Perhaps in the future a version will be released with these features on an 800 Kbyte (double-sided) disk.

MacGolf is an excellent and realistic simulation offering most of the basic characteristics of the game. It should help take your mind off the swamp, and the infamous alligators still lurking around your tilt-and-swivel office chair.

MacGolf is distributed by Imagineering (77 Dunning Avenue, Rosebery 2018; (02) 662 4499) and has a recommended retail price of \$99.95. □

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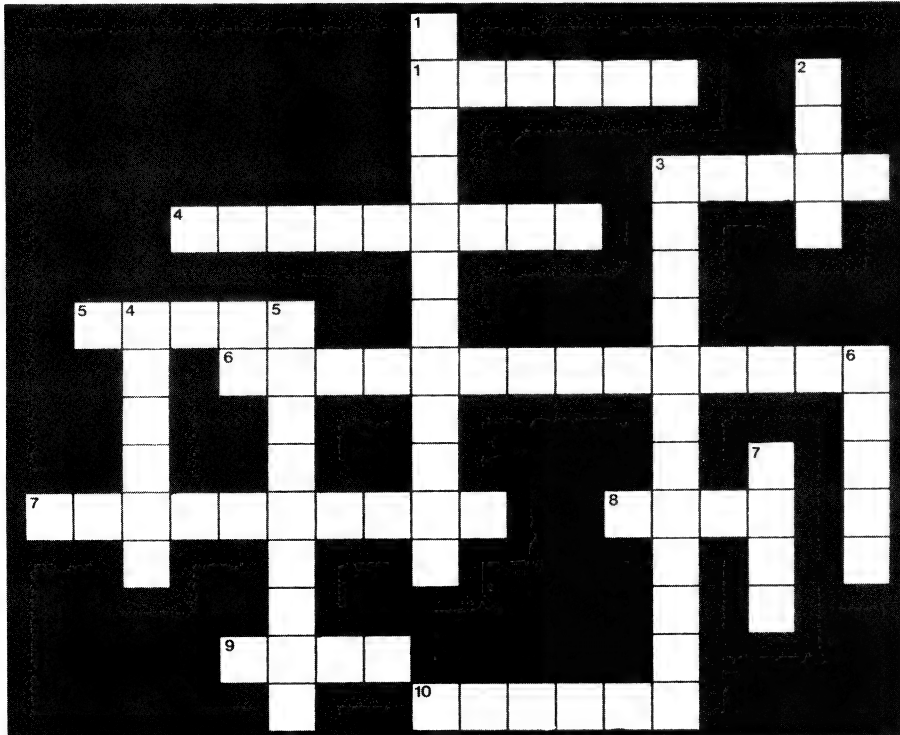
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ACROSS

1. Though you may find a use for liabilities, you'll be far happier with lots of these. (*Sounds like the name of a low-slung dog with droopy ears.*) (6)
3. How many times they must have said it: for every credit there must be a - (5) -.
4. When are children not a liability? When they're a tax - (9) -.
5. The - (5) - of the pudding is in the receipts. (*Who said you can't teach an old saying new tricks?*)
6. The free lunch was a - (6,8) -, so was the company car and the interest free loan.
7. The tax levied on profit made by foreign companies in Australia. (10)
8. The acronym for Pay As You Earn. (4)
9. The tax laws are full of them, and they also have their place in theatre. (4)
10. Rhymes with axeman — the Beatles sang about him (*"I'm the - (6) -, Ye-ah I'm the ..."*)

DOWN

1. If you buy and sell assets and make a profit, you'll have to pay this tax (who gains?). (7,5)
2. If in your self-assessment you fail, you'll find yourself directly in - (4) -. (*Don't feel too bad, happens in Monopoly all the time.*)
3. If the government could claim the - (12) - of the dollar as a deduction against its deficit, we would all be better off.
4. Woe betide if your return goes in late, but do you think they'd hurry up and send your - (6) - ?
5. There's no such thing as a - (4) -- (5) -.
6. And if that don't reflect on the state of the nation, get this — the only safe place for money is - (5) -annuation.
7. So you think Bob's getting a bit heavy, just wait till you get hit with the new - (4) -.

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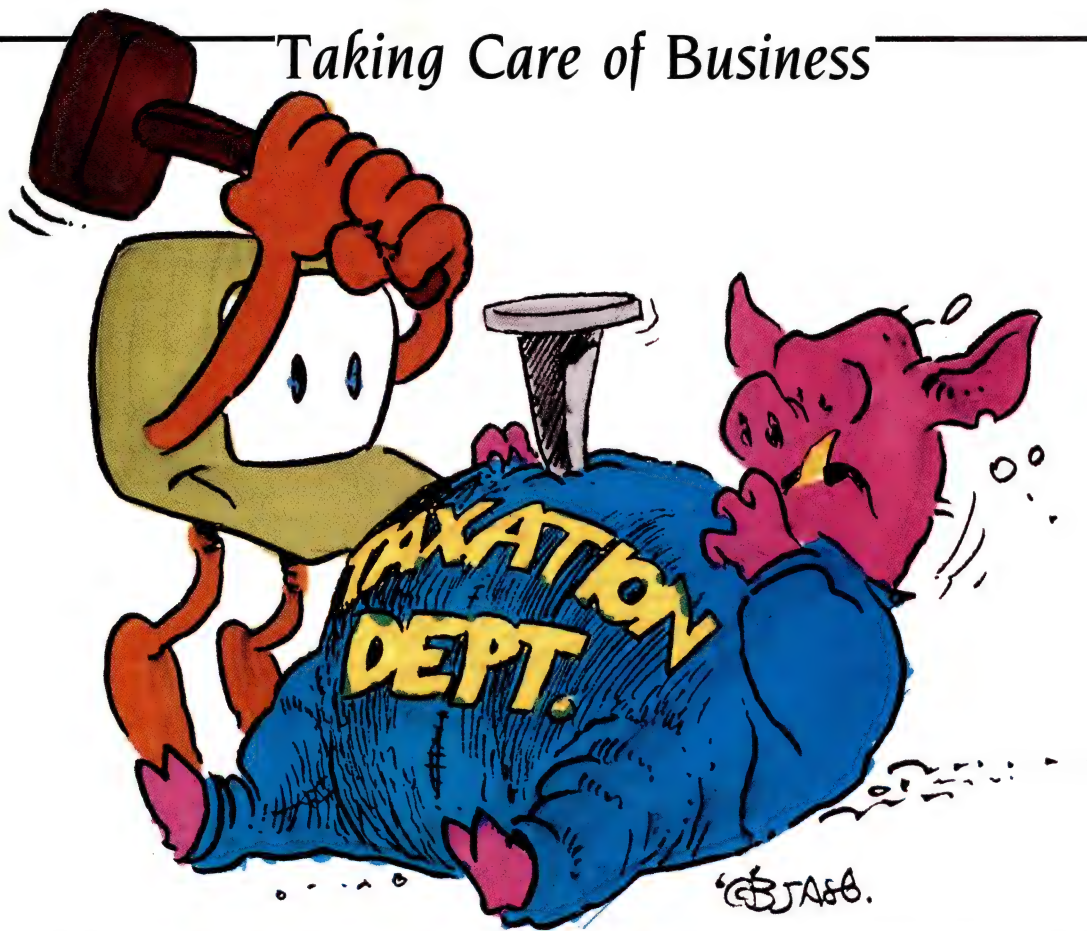
You've read about the packages in the past few pages, now tax your brain and fill out our Beat-The-Taxman Crossword. You can win one of three full-system accounting software packages (and the assistance of Dan Lawrence to install them and train your staff) or one of a further three 'starter modules'.

The **neatest, correct** entry received will choose from three complete accounting systems (the second most correct entry — or next neatest — will get second choice, and the third most correct entry will win the remaining package; in the event of a tie, entrants will be asked to compete in a tie-breaker):

Personal Computer Software is offering a full **PADMEDE** accounting system, including Trade Debtors, Invoicing, Inventory, Trade Creditors and General Ledger modules — valued at \$946. Dan Lawrence says this package is suited to use in small- to medium-sized businesses, or for accountants providing accounting and taxation services to small-business clients.

Or perhaps you'd prefer *Integrity Business Software's* **ASCENT** system "a single-user package which can be used to set up accounting facilities for an unlimited number of businesses, as well as self-contained accounting for branches." You'll receive Accounts Receivable, Accounts Payable, General Ledger, Cashbook and In-

Taking Care of Business



ventory Stock Control modules — valued at \$4640.

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They're all good'n'useful packages, so you won't be disappointed, whichever of our first lucky three you happen to be. And to help you get your prize up and running, Dan Lawrence, chartered accountant and expert in accounting software, will spend a week with each of the three winners, installing the package, assisting in the changeover from your current system, and training staff to use the new whizz-bangery. His time is valued at \$50 an hour - that's \$2000 for a 40-hour week!

Fourth, fifth and sixth placegetters will choose from a Padmede Debtors module (\$390), an Ascent Accounts Receivable module (\$950), and a Power Software Debtors module (\$1395) - enough to get you started on the road to computerised accounting.

ENTRIES CLOSE ON JANUARY 5, 1987

Conditions:

1. All entries must be made on an original crossword from *Your Computer* magazine,

and must include a daytime contact phone number for the entrant.

2. Our decision regarding winners is final, and no correspondence will be entered into over the competition, nor any interviews granted.

3. No employees or relatives of employees of the Federal Publishing Company, Eastern Suburbs Newspapers, Personal Computer Software, Integrity Business Software, Power Software or Dan Lawrence, are eligible to enter.

4. The competition will run in *Your Computer* for two issues, from November to

December, 1986, inclusive, and entries will close by the last mail received on January 5, 1987.

5. Entries which do not comply with these conditions, including entries received after the closing time or *those that do not give a daytime contact phone number*, will be disqualified.

6. The prizes in the competition have no monetary refund value, are not transferable, and cannot be substituted or varied (however, notwithstanding and nevertheless, you are permitted to use them to help make you extremely wealthy.) ☐

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LES BELL GETS IT WORD PERFECT

They said it would never happen! Governments could crash, the price of oil and even petrol might drop, but nothing — absolutely nothing — could induce Les Bell to abandon Wordstar. Seven years he's been using it, no way will he ever change. But then Word Perfect came of age . . .

I have seen a lot of editors and word processor programs in my time: Electric Pencil, Wordstar, EMACS, Spellbinder, vi, lex, Peachtext, Superwriter, Select, The Final Word, Easywriter, Word, Multimate, Displaywrite, plus the text editors in numerous more-or-less integrated packages. They all have their particular strengths and weaknesses, their flavours and styles.

Way back when, I bought Wordstar and set about mastering it, and have never had reason to regret that decision. As I've moved from computer to computer, so Wordstar has moved with me, and I still use it on the IBM PC and others. As my needs for additional features grew so I was able to buy packages for checking spelling, indexing and footnoting, or I wrote my own programs to do these things.

Wordstar and I have been happy all these years; sure, I've had brief involvements with Lisawrite and other programs when Wordstar wouldn't run on a particular machine, but generally I've stayed faithful. Nothing could tempt me away from a program I'd invested such a lot of time in.

Recently, however, we've been involved in evaluating a number of word processing packages — generally, the market leaders. One stands out clearly above the others — Word Perfect 4.1.

Word Perfect has been around for a long time now, almost as long as Wordstar. In its early versions, it struck me as a 'nice' word processor, but hardly likely to set the world on fire. It didn't seem likely to overtake Wordstar, so I mentally relegated it to the 'also ran' category.

Obviously the people at SSI Software just won't quit. For years now they've kept plugging away at the program, adding new features and extending its functionality in various ways, until they have come up with what I consider to be *the* outstanding word processor program on the market today. Nothing else even comes close.

Word Perfect 4.1 has just about every capability I would seek in a word processing program: it's a better-than-average editor, which can navigate around in large documents with relative ease; its print formatting is comprehensive; and it includes a range of features second to none, while still remaining easy to use.

The advanced features of Word Perfect include multi-file editing, multi-document keyword search, indexing, table of contents generation, sorting, mail-merging, footnoting, endnoting, several different column-editing modes, paragraph numbering and outlining, mathematics, spelling checker, thesaurus and macros. There's still even more, but you get the idea, I'm sure.

Installation

Word Perfect is very easy to install, as it is not copy protected. Simply make copies of the disks provided and work off them, or copy the files onto a hard disk subdirectory. The only installation required is of the printer — you have to choose from a menu of 32 different printer types.

There is also a set-up menu, which is activated by typing in WP/S instead of WP. This allows you to select directories and drives for the thesaurus and dictionary files, as well as screen sizes, back-up options and beep options for when errors occur (such as making an inappropriate menu selection).

Incidentally, there are a number of other start-up options for the program. For example, A>WP /R /DB: will allow the user to remove the program floppy from drive A.; it makes all the menus, error messages and overlays memory resident, and uses drive B: for overflow files, buffers, and so on. This provides fast operation on a floppy-only system. The switches can also be installed in the DOS environment by using a SET command in your AUTOEXEC.BAT file (good thinking, that).

The screen display is simple and uncluttered, consisting at start-up of a blank screen with a flashing cursor at the top left hand corner and a status line at the bottom which contains the following information:

Word Perfect

DOC 1 PG 1 Ln 1 Pos 10

Creating Documents

You can now go ahead and create a document, which is only named when it is saved. To load an existing file the LIST FILES (F5) option is used. A prompt will appear at the bottom of the screen which allows the user to type in a wildcard filename (including a directory path). This will display a directory of files on the disk, in two columns, with 10 options available from a menu at the bottom of the screen:

The cursor at this stage is positioned on

1 Retrieve 2 Delete 3 Rename 4 Print 5 Text In
6 Look 7 Change Directory 8 Copy 9 Word Search 0

one of the files in the directory listing, and the arrow keys allow you to move to any file. Once the cursor is positioned on the file you want, you simply type '1' for retrieve and the file is opened, ready for use.

Cursor Control and Movement

Cursor movement around the screen is basically achieved using the arrow keys. A Go To function (the Ctrl and Home keys) allows movement from the top to the bottom of the screen, using the up and down arrow keys and positioning the cursor at a particular word or line number. The Home key on its own allows movement to any of the edges of the screen.

Backups

Word Perfect includes two automatic back-up features on the Set-up menu:

timed back-up and original back-up. Timed back-up is used to minimise the damage which might be caused by a power or machine failure, and backs up your file at selected intervals (say, every five minutes) to a specified drive.

The original back-up option creates a back-up with the extension of .BK!. When a file is edited and saved, the original is named as the back-up and the latest version becomes the 'new' original.

Marking Blocks

Many of Word Perfect's print enhancements (such as bold facing, centering, underlining, and so on) can be turned on or off over a range of text called a block. Marking blocks is simple — 'Alt-F4' marks the beginning of the block, the appropriate enhancements are selected (usually from function keys), and then 'Alt-F4' is pressed again to end the block function.

Alternatively, print enhancements can be turned on and off while you're entering text, by simply pressing the appropriate function key (see below and Figure 1). It is also possible to lock a paragraph, which stops it from being split by soft page breaks.

Putting on a Bold Face

To bold face, centre or underline text,

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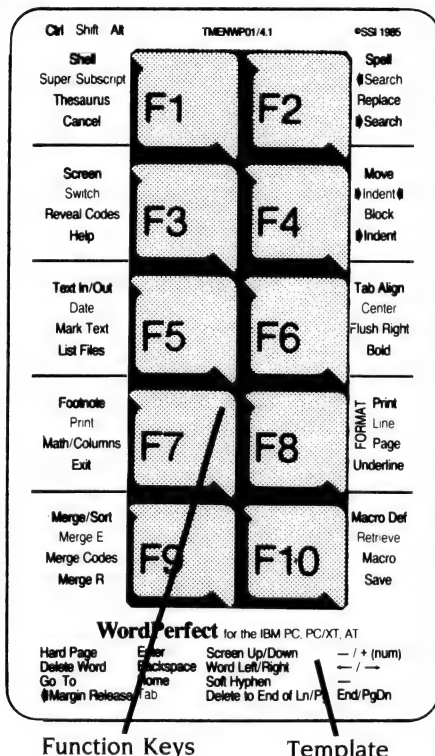
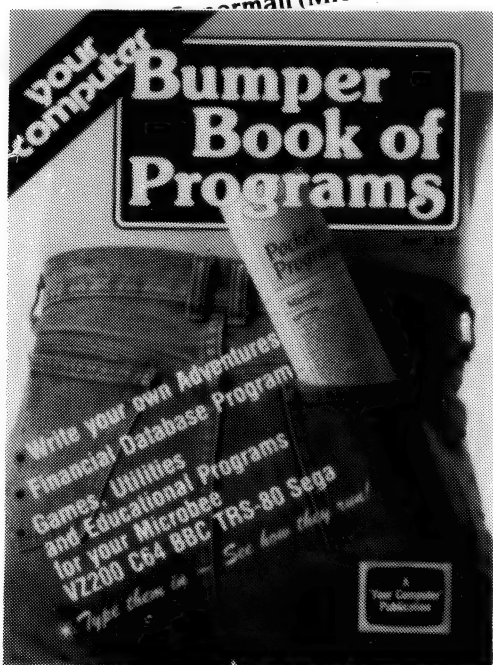


Figure 1. Word Perfect's function key template — The four 'functions' shown next to each key are invoked (from top to bottom) with the CTRL, SHIFT, ALT, or only the function key itself.

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00440 NORMAL : CURS 25,10 : PRINT " WELL DONE! " : CURS 19,11
IVED 8 ROUNDS! " : PLAY 9:11:8:12:7:11:6:14:5 : GOTO 290
00450 NORMAL : PLAY 1:10 : CURS 27,10 : PRINT "BAD LUCK" : GO

Word Perfect

The Word Perfect manual is very well organised. An introduction explaining essential concepts is followed by a tutorial section which has obviously had some input from an educational psychologist. Each chapter explains clearly what you will achieve, how this will be done, what you will learn and why you want to learn it.

press the F6 or F8 keys (respectively) before typing in the block to be enhanced, and then press the same keys again to turn the function off. Text can also be aligned with the right margin in the same way. On colour terminals the boldfaced text is shown in a different colour from the rest, but the underlining function isn't represented. On a monochrome screen, the only way you can see which functions have been used is to hit the Alt-F3 key, which reveals the codes themselves. This function splits the screen and shows the text as it will print on the top of the screen and the text with codes revealed on the bottom half of the screen. Neat.

Naturally, Word Perfect also supports block moves, using a 'cut and paste' paradigm. A block can be cut or copied into a buffer using the Ctrl-F4 key, which produces the following menu:

Having positioned the cursor at the beginning of the area of text that needs to be moved or copied, you then select one of the first three options above, to define whether you are copying a sentence, paragraph or page. A second menu then appears in the bottom left-hand corner of the screen, asking if you want to cut or copy the text. Cut removes and saves the

text, while copy saves and leaves the text on the screen.

You then move the cursor to the place on the screen where you want the text to reappear and insert it, using Ctrl-F4 and choosing option 5 from the retrieve section of the menu. If you're moving columns or blocks of text, the BLOCK command is used before repositioning, simply to define the amount of text being handled.

Entire files can be deleted in the 'List Files' mode, by positioning the cursor on the required file and selecting Delete from the menu bar. Blocks of text are deleted by using the Block command to mark the text and then pressing the Del key. Single characters are annihilated using the Del and backspace keys, while control codes can be deleted in the 'DisplayControl Codes' mode.

Undeleting Text

The last three deletions (of any kind except files) performed are saved by Word Perfect, in case you change your mind. There is no limit to the number of characters which can be saved.

Footnotes/headers

Headers are created using the Alt-F8, 6 keys to display the headers or footers menu. A header or footer may be on every page, on odd pages or even pages, and may be underlined, centered or bold. The header/footer is not visible on the screen, but can be viewed using the Reveal Codes key.

Indenting

The tab key functions as you would expect, but Word Perfect offers many more paragraph/margin options. A common requirement is to indent a paragraph at both the left and the right margins, to offset it from the main text: a single keystroke, Shift-F4, does this automatically.

A hanging indent on the left only is achieved with the F4 key. All indenting stops when a hard return is pressed. Margins can be set to any position between 0 and 250.

Password Protection

Ctrl-F5, 3 locks and saves the document on the screen. The password to recall it is

Move 1 Sentence 2 Paragraph 3 Page
Retrieve 4 Column 5 Text 6 Rectangle 0

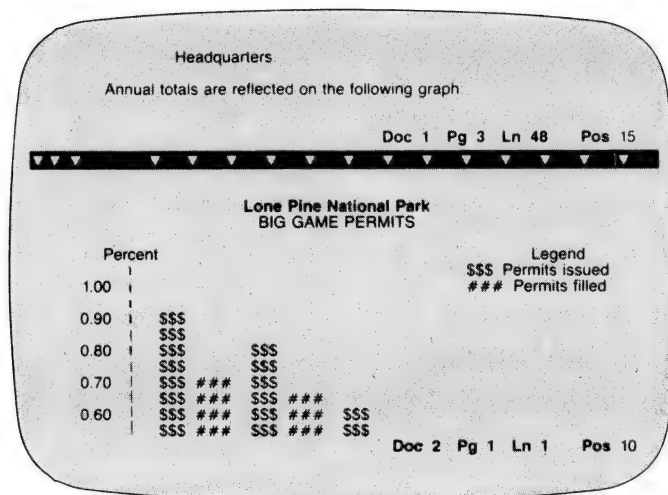


Figure 2. Word Perfect allows simultaneous editing of two documents by splitting the screen with the window option — the Tab Ruler shows the split.

entered twice and can contain up to 75 characters.

Viewing Documents

Documents can be viewed through the Look option on the ListFiles menu, which displays the first page of each file selected in the chosen directory.

It is possible to find all documents which contain a particular word or phrase, using the Word Search option on the List Files menu.

Page after Page

Page lengths can be changed as many times as is required in a document, and the position of the page number can be changed using Alt-F8, I, which produces a menu with the following options:

- No page numbers
- Top left of every page
- Top centre of every page
- Top right of every page
- Top alternating left and right
- Bottom left of every page
- Bottom centre of every page
- Bottom right of every page
- Bottom alternating left and right

Global Search/Replace

The search option on the F2 key allows searching for text or codes backwards or forwards. Alt-F2 allows you to search and replace; replacement may be automatic or prompted, and only works in a forward direction.

Fancy Footwork

Two documents can be edited simultaneously by splitting the screen with the window option. The Tab ruler is used to separate the documents and the length of the window can be set by the user. The minimum length of a window is two lines (see Figure 2.)

One file may be read into another by pressing Shift-F10 — this function works in the same way as ^KR in Wordstar.

Word Perfect also allows multicolumn editing in two formats: either snaky columns, as used in newspaper-style layouts, or horizontally aligned columns, as used in table layouts or scriptwriting.

Numbering for footnotes/endnotes is an automatic menu-driven process. The Ctrl-F7 key brings up a menu with options such as create or edit. Creating a new footnote brings up an almost blank screen with the number of the new footnote automatically calculated and a flashing cursor prompting you to enter the text for the new footnote. A note can be up to 16,000 lines (approximately 300 pages) long.

Once the text of the footnote has been finished the exit key will return you to the document at the place where the new footnote number has been inserted. To edit a footnote, you invoke it by number. If you want to delete footnotes, you remove their numbers from within the text, using the normal Delete or Backspace keys, and Word Perfect automatically removes the corresponding text from end of the document and rennumbers the remaining footnotes. Endnotes work in much the same manner as the footnotes.

Word Perfect also allows indexing of various parts of a document, such as tables, graphs, main headings and so on.

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To give you something to index ... the Line Draw function enables you to draw boxes, graphs, borders and other illustrations, using the DOS graphics characters. Diagrams can be drawn around and over existing text, using the arrow keys to move the cursor. The Ctrl-F3 key enables this option to be chosen from a menu, while a subsequent menu offers a choice of line width, various densities of shading and the ability to erase.

The redline and strikeout features are used to mark text for suggested editing. The control codes do not appear on the screen; only when the document is printed are they apparent, showing a vertical bar in the left-hand margin for text which has been redlined, and a dash through each character that is struck out.

Word Perfect supports reverse half-line feeds and has special features to allow typing of mathematical formulae. Together with its indexing and footnoting features, this makes it virtually the ideal program for thesis and report preparation.

Macros

A series of keystrokes can be captured and stored in a file, and then replayed whenever required. This is a particularly powerful feature, allowing the creation of new functions which can be activated with just a few keystrokes.

Dates, Numbers and Sorts

Another especially useful option allows the date to be inserted in documents, in any of a number of formats. Alternatively, a date code may be inserted into a document, which causes the current date to be inserted whenever that file is retrieved or printed. The time can also be incorporated in this fashion.

The maths section of Word Perfect is easy to use. Calculations can be entered in columns defined by tab stops, so a document can be set up like a spreadsheet to perform total and subtotal calculations. The usual four maths operators are supported, and they may be used in formulae.

Word Perfect also contains a general-purpose sort utility, which can sort records in a mailing list file, lines of text or paragraphs. It is quite a smart sort, in that it can sort on surnames, even in files which have names entered in the form John Q. Public, and can perform partial sorts and multi-key sorts.

Word Perfect includes two automatic back-up features on the Set-up menu: timed back-up and original back-up. Timed back-up is used to minimise the damage which might be caused by a power or machine failure, and backs up your file at selected intervals (say, every five minutes) to a specified drive.

Spelling to the Converted

The Word Perfect spelling checker contains over 100,000 words, but uses American spelling. It will check a word, page, document or block of text, perform pattern look-up, phonetic look-up, check for double occurrences of a word, and even supplies a word count. For the pattern look-up wildcards may be used.

We ran our standard spelling checker test on Word Perfect — the results are shown in Table 1.

Word Perfect also includes a thesaurus, which is quite easy to use, and ... a conversion program.

This last converts files from selected programs to Word Perfect format and vice versa. The Text In/Out feature converts a file to ASCII format (without any word processing codes). The convert program is totally menu driven and can use the following formats: Wordstar, Multimate, DIF files and DCA transfer. The last format is particularly important, as IBM's Document Content Architecture is emerging as the *de facto* standard for document transfer between PCs, minis and mainframes

Documentation

The Word Perfect manual is very well organised. An introduction explaining essential concepts is followed by a tutorial section which has obviously had some input from an educational psychologist. Each chapter explains clearly what you will achieve, how this will be done, what you will learn and why you want to learn it (keep the student motivated!).

This is followed by an alphabetically organised reference section, which covers all the commands and features of the program, and a series of sections on advanced topics.

I guess that for the first-time user, battling to master the computer, this will all look a bit intimidating, but it is comprehensive and well organised. There are a few minor omissions: for example, we discovered additional cursor-movement

FOUND/CORRECTED

abcess
picnicing
mischevous
exorbetant
hygenic
unnecesarily
busses
batalion
pariplegic
quadraplegic
accoustically
exilarated
questionnaire
pronounciation
center - corrected to centre
organisation - corrected to organization

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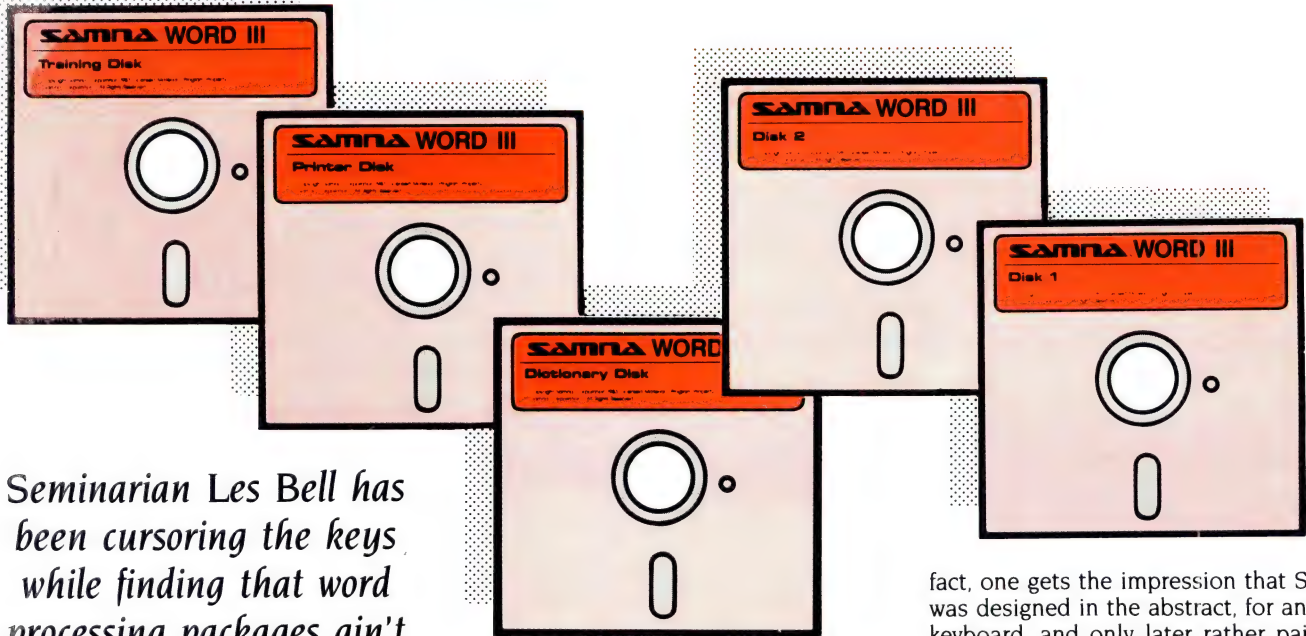
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SAMNA



Seminarian Les Bell has been cursoring the keys while finding that word processing packages ain't alla Samna. In fact, he found how easy this one is to use while trying to quit . . .

Regular readers (and attendees of my seminars) will be well aware that dedicated word processors and Pascal are my two *betes noirs*. I can see no point in their continued existence, and long ago vowed to single-handedly (if necessary) rid a grateful world of their ill effects.

So far, only Turbo Pascal (which is not really Pascal at all, but a new language which is essentially contrary to the spirit of Pascal) has stopped me from achieving this goal. There will always be a few die-hards who will continue using Pascal, but some people simply cannot be saved from themselves.

On the word processor front, things have been a lot easier. Users have pro-

gressively abandoned the dedicated machines in favour of personal computers with good word processing programs, and the last bastions of support for dedicated word processing machines have been the manufacturers of those very machines.

But even there, there have been those who dared to abandon conventional wisdom and pointed out to management that unless they shifted the accent to personal computing, they would get eaten alive by the competition. Look around you and see if you recognise these giants of the industry: NBI, Lanier, Remington — I was trying to come up with more but those are all I can remember.

It was at Lanier that one group of executives got fed up with pointing out the danger of the personal computer competition. They decided to form their own company to produce a powerful word processor package, and the result was Samna.

Samna seems to emulate dedicated word processors' mode of operation without taking account of the fact that the PC keyboard is laid out rather differently and does not have as many function keys. In

fact, one gets the impression that Samna was designed in the abstract, for an ideal keyboard, and only later rather painfully shoe-horned into the PC keyboard.

Perhaps the biggest problem the program has is the way the keyboard is used — quite illogically, it seems to our reviewers — with functions scattered all over the keyboard and virtually no attention paid to what the legends on the keys say or suggest.

In practice, we found Samna to be difficult to learn and use, cumbersome, slow and vastly over-rated.

At First Glance

At least installation of Samna is straightforward, using the program supplied, which prompts for disks to be inserted for copying to the hard disk. The copy program asks for your company name and inserts it into Samna's sign-on screen. The use of the installation program implies the use of copy protection, yet there is no mention of this in the manual. Touching wood, we erased all the Samna files from the hard disk and then reinstalled the program, with no problems.

Samna's screen display is quite different from other word processors. The program seems to assume the document will

Samna III

be narrower than the screen, since it displays the margin widths as great slabs of shading on either side, making the screen look small and cluttered. The status line and the document information are displayed at the top of the page, with a thick, highlighted grey line displaying the tab stops. Also at the top of the screen is the name of the document being edited.

Samna takes 'ages' to boot, but once the screen comes up the first thing it asks for is the date — surely this will have been set during the PC cold boot, or from a battery-backed real-time clock?

If no specific document is being used or edited, the blank screen is referred to as the 'Scratchpad' in the top right-hand corner of the status line. Alternatively, if a filename has been specified using the F1 key (save and display), the file name will be shown. There are three options available from the F1 key function:

1. To save — Return,
2. To display a different file — Type name and return,
3. To display a directory list — Type D and return.

This led to the first of many surprises with Samna: these options do not mention drive specifiers, yet selecting choice 3 (not by pressing the '3' key, I hasten to add) gives an error message. By D, what Samna means is a drive specifier, not literally the letter D. Hmmm ...

To display a directory list, you actually have to type in the drive and any wildcard specification. You can move around in a directory listing using the arrow keys, and you select a file by placing the cursor on its name in the listing and pressing the F1 (save and display) key.

If you want to save a new document, the program will prompt you for a filename before saving it. If you are working with a file that already exists on a specified drive, it will just go ahead and save it. Once the document has been saved, Samna clears the screen and waits for a new document to be created or an old one to be retrieved; so, periodically saving your work (which we all know is good practice) and continuing is tedious, since each time you save, you have to read the file in again. Most other word processors have some kind of 'save and continue' function (Word Perfect does automatic timed back-ups, while even dear old WordStar has the ^KS command).

As with most other word processors, Samna can be set to automatically back-

up files when they are saved (this is an optional default). Two back-ups are created for each file, with the extension BK1 or BK2; the BK1 file is an exact copy of the original file, while the BK2 file is a copy of the previous BK1 file. Samna back-up files have the same status as regular files, and can be edited, printed and so on.

Samna also has a back-up menu, which allows backing up of entire disks or batches of files, allowing the user to avoid the DOS interface.

Windows

Two files can be edited at once, by splitting the screen into two windows. To invoke the windowing option, one of the files must already be displayed on your screen. To split the screens you press Cntrl and the 'Save and Display' key (F1), followed by the name of the file that you wish to display. The new document and the cursor will then both be in the top window. To move between the windows you use the 'Go To' and 'File' keys (the 5 key and the + key, respectively) on the numeric keypad.

Cursor Those Keys

Cursor movement within a document is controlled mainly by the arrow keys (on an IBM PC keyboard), but for moving more than one letter or line at time, Samna has extensively redefined other keys on the board, and since the supplied template is not very detailed it can get rather confusing. A determined reading of the manual revealed the following cursor movements:

- HOME — moves to the next word,
- PGUP — moves to the next sentence,
- PGDN — moves to the next page,
- END — moves to the next paragraph.

Once you work it out, it's quite logical, since all these cursor-movement keys are grouped together.

Three other key definitions are clear from the template: ESC summons help, the Alt-PrtSc keys combine to cancel any feature you may have invoked, and the Scroll Lock key is used to 'mark' text.

Mark My Words

There are a variety of options available when marking text: you can insert headers/footers, page breaks, a double underline, page numbers and so on. But you can't always see these enhancements on the screen; often their effect is only shown when the document is printed.

If you choose the Footnotes option from the 'Mark' menu, the sub-menu

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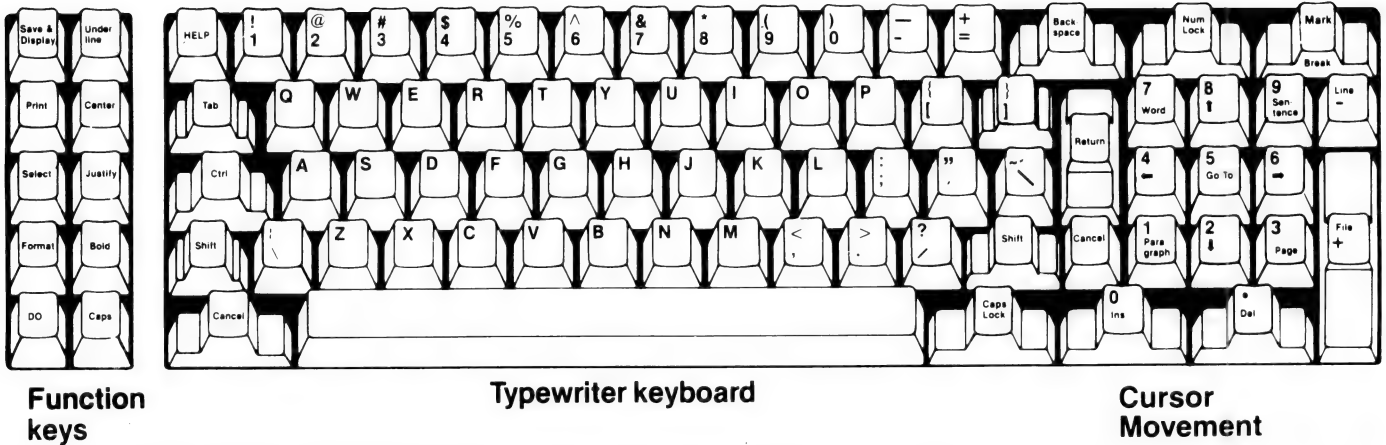
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The Samna Keyboard



shown in Figure 1 appears. Your cursor must be in the position in which you want the footnote to appear. Pressing the return key produces three fff's where the cursor was and splits the screen in two, with the cursor now in the upper window, waiting for you to enter the footnote. Pressing F1 (save and display) followed by return saves the footnote and returns you to the document. Footnotes are numbered when the document is printed.

functions. To centre text while you are typing, hold the shift key and centre-function key (F4) and return. (While you're typing? Why, Les, you little contortionist — Ed.) Any text entered thereafter will be automatically centred. To centre text which has already been typed, you press F4, and then shade the area that is to be centred.

Justification of text can be toggled on or off, as required. It is F6 on the template (does this function really merit a whole

of text, once it has been highlighted, to an outside file or to another area in the document. Such moving involves the text being sent to a temporary buffer, deleted from its previous position, and being inserted in its new position with Cntrl-Ins.

Text and columns can also be copied to another area in the document by the same procedure as moving, by choosing the copy option from the Do menu. You shade the area you want to copy, it is placed in a buffer, the Cntrl-Ins copies the text to the new area. I wondered whether I could copy material from the buffer again and again without having to go through the same procedure ... Yes, the data remains in the buffer until something else overwrites it, so to reinsert the same information somewhere else, you simply press the Cntrl-Ins keys — you copy?

It should be noted that the block move/-copy buffer is also used as the undelete buffer. This means deleting text will overwrite the copy buffer, while copying will prevent undeletion of text stored there previously.

Also on the Do menu, is the facility to read one document or block of text into another, using the copy command.

And, of course, you can delete blocks of text; again, the method is to position the cursor at the beginning of the text you want to del, press the del key, shade the area you want to zap, and press return. To delete a column of text, the letter C has to be typed before shading.

As mentioned before, Samna allows you to undelete text, provided you haven't sent anything else to the buffer (say, while copying), since deletion.

The Do menu also offers a search-and-

Figure 1. Choosing Samna's Footnote option displays the sub-menu shown above. Footnotes are automatically numbered when the document is printed.

```

TO REFERENCE A FOOTNOTE AT THIS POINT ----- RETURN
----- TYPE THE FOOTNOTE IN THE "WINDOW".
WHEN DONE ----- TOUCH SAVE & DISPLAY ----- RETURN.
    
```

Page numbering works in a similar way. Before choosing this option from the 'Mark' menu, your cursor must be positioned where the page number is to appear. The program places an 'A #' as an indicator, and the actual number is shown only on the printed document.

The F8 key is used to define bold-faced text. You can 'embolden' words as you type them, or embolden existing text. To do the latter, you have to 'shade' the area first. The underlining function works in the same way. To undo or stop either enhancement, you press the Shift key and the appropriate function key simultaneously. To unbolden text which has already been boldened, you have to shade the area beforehand.

Formatting

The centring function works in much the same way as the bold and underlining

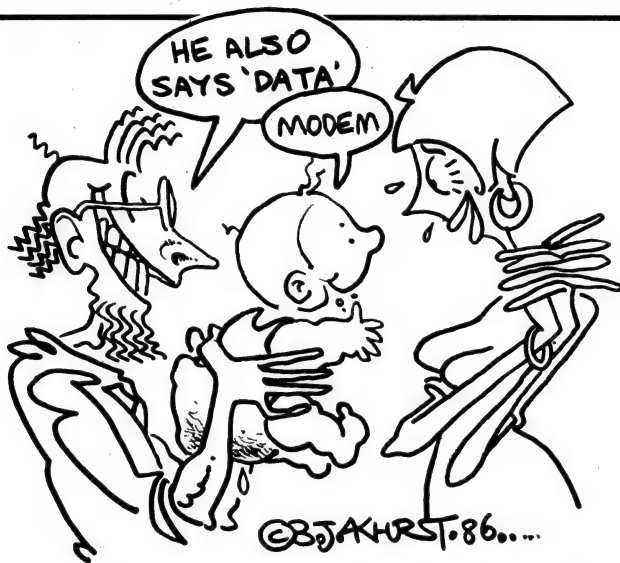
function key to itself?). You can stop justification at any time, by simultaneously pressing the Shift and F6 keys. To justify existing text, you place the cursor on the first line you want to justify, press F6, shade the area that you want justified and press Return.

The setting of tabs is controlled by the Format key — F7 on the template. Having enabled F7, you move the cursor to the spot where the tab is to be placed and press T for tab. This procedure can be repeated as many times as necessary. To clear all tab stops, press F7 and then C for clear.

The tab key is used to indent, say, at the beginning of a paragraph, while Cntrl-TAB will indent a whole paragraph.

Let's Move It, You Blocks

The move option comes under the Do key (F9), and allows you to transfer a section



replace function; you simply select the S option for search, type the string to search for, and press return.

Lemmeout!

How do you exit Samna? Good question. It's not obvious from the program, and the manual doesn't want to make it obvious — I checked the index under 'exit' and 'quit', but the index had never heard of exit, and the 'quit' heading referred me to page I.1, which offered no information on quitting, but said lots about how "easy" Samna is to learn. During a random reading of the introductory manual I stumbled across the answer. The means for quitting is hidden within the Do command menu, where, logically enough (once you get there), X is for exit. I also discovered that under Samna, Ctrl-Alt-Del does not do the expected and reboot the PC — it exits Samna!

Help Screams

Samna's Help screens are a combination

of low- and high-intensity text. They are not very readable, or well-organised, or clear as to what you are to do and what happens if you choose a particular option. Help menus pop up quite often, especially when the wrong key is hit. Samna also appears to have a lot of error messages. Because the help screens are not clear in telling you what key to hit for a certain function, it's inevitable that the wrong key will be hit, so it's not unusual to get a sort of rolling commentary of error messages and help comments at the top of the screen, until you work out what's going on.

Spelling Checker

The spelling checker is context sensitive and quite easy to use. The F5 key (also known as SELECT) produces a menu with a Proof option; this goes through the entire document and proofreads it, flagging any mistakes it encounters and offering alternatives. The entire process is menu driven. Table 1 shows how Samna scored in our standard spelling test. ▷

Table 1. Samna's context-sensitive spelling checker is easy to use. Results of our standard spelling test —

FOUND/CORRECTED	NOT FOUND/NOT CORRECTED
abcess	picnicing - it offered a possible solution of BICYCLING
mischevous	
exorbetant	
hygenic	
unnecesarily	quadraplegic - no alter.
batalion	
pariplegic	
accoustically	center - flagged as correct
exilarated	
questionnaire	organisation - corrected to organization
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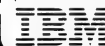
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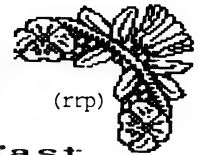
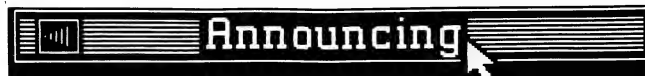


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Samna III

Maths/calc

The F5 key also enables you to enter Samna's Math mode, which offers multiplication, division, subtraction, addition and percentage. There are three registers provided: the Total register, where all calculations are performed, and two registers in which results are saved. There are also 'get' and 'put' options, which allow you to transfer numbers from a document to a calculation and back again. Columns of numbers can also be calculated.

Indexing/Table of Contents

Samna allows for indexing of a file, based on a list of words. This produces a list of indexed words referenced to the page numbers on which they appear in the master document. This is a menu-driven procedure, but whenever something goes wrong while creating a list, Samna produces more of its cryptic error messages, which are not very helpful.

A Table of Contents function is also included, allowing up to three levels of

headings. This function is accessed by pressing the MARK key (scroll lock), then T, then the number of the level in which you want the entry to be placed, and finally Return, which will then mark the statement or title as a table of contents entry. When this is repeated throughout the document there is an option from the SELECT menu (F5) which enables you to type in the filename for which the contents is to be created. The table of contents file created will have the same filename as the master file with the exception that its extension will be .TOC.

Documentation

Documentation for Samna includes a Read Me First booklet, containing information on how to install Samna and four lessons, each with its own set of exercises, on how to use some of the package's most used features. This documentation is helpful in areas where Samna's is lacking. □

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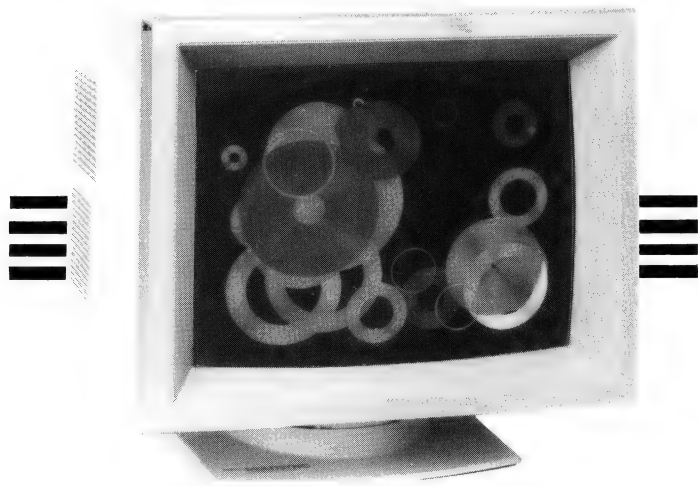
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BYTING PRODOS BACK

In a new tutorial series, Stewart Fist offers Apple users a basic guide to how ProDOS handles files — with special reference to the problems associated with keeping Appleworks files on hard disk.

BY NOW, most Apple users are familiar with ProDOS, and despite initial reservations, most of us have learned to accept it as a better operating system than the old DOS 3.3.

At the time Apple changed over to ProDOS, it wasn't overly apparent to many people why the swap was necessary. DOS 3.3 was one of the great "user-friendly" operating systems in the evolutionary path of computers, and ProDOS will never ignite the same affection in users. ProDOS was certainly "bigger, faster and more powerful" but it has the chrome-and-plastic slickness of a modern Japanese car, as opposed to the rugged reliability of a faithful old FJ Holden.

But ProDOS is here to stay. We've had to face the fact that even small-system computers like the Apple II are fast moving into an era of massive mass-storage systems. Not just our current magnetic hard disk systems (though the newly developed R-DAT recording techniques seem to indicate that magnetic tech-

nology is still hot in the running), but also CD-ROM and the exotic optical storage systems of the future.

ProDOS can handle up to 32 megabytes in one volume and 16 megabytes in any one file, so it'll do most Apple users for the time being.

When computer users face the prospects of having hundreds, or thousands of files on a single mass-storage device, they run up against the limitations of the human brain. A computer can flick through a thousand-entry catalog in a fraction of a second, but a human can't. So the cataloging system must be designed in a branched 'hierarchical' structure if we are ever going to find anything on a large disk.

ProDOS's directory structure therefore makes sense for anything with more capacity than the standard floppy drives — although it must be admitted that the use of multi-level pathnames is annoying for single-sided floppy disk users, on occasions. And when you're trying to find, re-

pair or recover information on a disk, a branched directory structure adds to the complexity.

Saving Space with Blocks

When a ProDOS disk is first formatted, only one 'block' of disk space is reserved for the main 'volume' directory. This volume directory can carry a maximum of 51 file entries, but each of these entries can itself be a subdirectory occupying another block of disk space — and that block can be anywhere at all on the disk.

This means that the operating system doesn't need to allocate a large number of disk blocks for directory use initially — it does this progressively when needed. The volume directory and the subdirectories are simply treated by ProDOS as different forms of a normal file, so you don't get space allocated for, but not used by, subdirectories.

What ProDOS gives, ProDOS also takes away. While the directory allocation system saves wasted disk space on floppies, ▸

where subdirectories aren't usually needed, ProDOS often does waste disk space through the use of 'blocks' rather than 'sectors' as the primary disk division (see the Track/Sector to Block Conversion Table for the conversion calculations).

By definition, there are two disk sectors to each block, so sectors are always allocated in pairs. Normally, this would mean a textfile with only a couple of words would still take up two sectors of disk space (one block), in addition to the directory and formatting information.

To avoid this 'space waste', ProDOS treats these short files in a different way to the longer ones. For instance, Appleworks files with under 200 characters (about 30 words) are registered with the operating system as 'seedling' files and treated quite differently to the longer 'sapling' files. (Non-Appleworks 'seedling' files can be up to 256 characters in length — which still isn't much.)

ProDOS manuals and articles talk a lot about 'seedling', 'sapling' and 'tree' files, without ever getting down to the nitty-gritty of what these terms mean in a practical sense. To understand this you've got to look at the way ProDOS stores information on the disk itself.

Inspect Your Disk

So if you want to understand ProDOS you should first invest in a good disk-inspection program. Pro-Byter, from Beagle Brothers (at US\$39.95), is probably the best value for money at the present time. Send a Visa card or Mastercard number to Beagle Brothers, at 3990 Old Town Avenue, San Diego CA 92110, and ask for it to be sent airmail — or you'll be waiting three months.

If you've got either the old DOS 3.3 version of 'Apple Mechanic' or the 'Tricky Dick' disk-zapping program, you can use them to look at a ProDOS floppy, but initially you'll find the sector allocation quite confusing. This is complicated by the fact that two sectors are equal to one block (usually designated Part A and Part B), and these sectors aren't always alongside each other, as can be seen in the Conversion Table.

Looking at the ProDOS disk itself, the main (volume) directory now starts at Block \$02 Part A (all block numbers are in hex), which in the old terminology would be Track \$00 Sector \$0B. If your disk holds more than five files, the second part of this directory (Part B) would be found at Track \$00 Sector \$0A.

Another part of the disk which you should identify is Block \$06 (Track \$00, Sector \$03/\$02), which is reserved for the bit-map. This bit-map is checked by ProDOS whenever it is writing to a disk to see which blocks are free for use; it works like a large sheet of graph paper on which the computer notes whenever a block is used. We'll go into how this works later in the series.

Operation Rescue

ProDOS has a simple system of allocating disk space. It uses the lowest block number available and then moves to the next block. This makes it fairly easy to track a file through a disk if you've accidentally deleted it; you always start from the lowest block number and then move progressively up. You might not find that every free block you come across contains some of your files (some might have been used before for another file), but you can be quite sure that your file will be in numeric sequence.

If you've both deleted and overwritten a long textfile with a much shorter one, the chances are that a significant part of the text will still be recoverable. The overwrite

Sector Offset Chart				Track/sector to Block Conversion										
				TRACK	\$00		\$01		\$02	\$03	\$04	\$05	\$06	
					Hex	Dec	Dec		Dec					
Sector	Offset	Sector	Offset											
No.	+ Part	No.	+ Part											
\$00	0 A	\$08	3 B	\$00	\$00 A	0 A	7 A	6 B	6 A	5 B	5 A	4 B		
				\$01	\$08 A	8 A	15 A	14 B	14 A	13 B	13 A	12 B		
				\$02	\$10 A	16 A	23 A	22 B	22 A	21 B	21 A	20 B		
				\$03	\$18 A	24 A	31 A	30 B	30 A	29 B	29 A	28 B		
				\$04	\$20 A	32 A	39 A	38 B	38 A	37 B	37 A	36 B		
				\$05	\$28 A	40 A	47 A	46 B	46 A	45 B	45 A	44 B		
				\$06	\$30 A	48 A	55 A	54 B	54 A	53 B	53 A	52 B		
				\$07	\$38 A	56 A	63 A	62 B	62 A	61 B	61 A	60 B		
				\$08	\$40 A	64 A	71 A	70 B	70 A	69 B	69 A	68 B		
				\$09	\$48 A	72 A	79 A	78 B	78 A	77 B	77 A	76 B		
\$01	7 A	\$09	3 A	\$0A	\$50 A	80 A	87 A	86 B	86 A	85 B	85 A	84 B		
				\$0B	\$58 A	88 A	95 A	94 B	94 A	93 B	93 A	92 B		
				\$0C	\$60 A	96 A	103 A	102 B	102 A	101 B	101 A	100 B		
\$02	6 B	\$0A	2 B	\$0D	\$68 A	104 A	111 A	110 B	110 A	109 B	109 A	108 B		
				\$0E	\$70 A	112 A	119 A	118 B	118 A	117 B	117 A	116 B		
				\$0F	\$78 A	120 A	127 A	126 B	126 A	125 B	125 A	124 B		
\$03	6 A	\$0B	2 A	\$10	\$80 A	128 A	135 A	134 B	134 A	133 B	133 A	132 B		
				\$11	\$88 A	136 A	143 A	142 B	142 A	141 B	141 A	140 B		
				\$12	\$90 A	144 A	151 A	150 B	150 A	149 B	149 A	148 B		
\$04	5 B	\$0C	1 B	\$13	\$98 A	152 A	159 A	158 B	158 A	157 B	157 A	156 B		
				\$14	\$A0 A	160 A	167 A	166 B	166 A	165 B	165 A	164 B		
				\$15	\$A8 A	168 A	175 A	174 B	174 A	173 B	173 A	172 B		
\$05	5 A	\$0D	1 A	\$16	\$B0 A	176 A	183 A	182 B	182 A	181 B	181 A	180 B		
				\$17	\$B8 A	184 A	191 A	190 B	190 A	189 B	189 A	188 B		
\$06	4 B	\$0E	0 B	\$18	\$C0 A	192 A	199 A	198 B	198 A	197 B	197 A	196 B		
				\$19	\$C8 A	200 A	207 A	206 B	206 A	205 B	205 A	204 B		
				\$1A	\$D0 A	208 A	215 A	214 B	214 A	213 B	213 A	212 B		
				\$1B	\$D8 A	216 A	223 A	222 B	222 A	221 B	221 A	220 B		
				\$1C	\$E0 A	224 A	231 A	230 B	230 A	229 B	229 A	228 B		
				\$1D	\$E8 A	232 A	239 A	238 B	238 A	237 B	237 A	236 B		
				\$1E	\$F0 A	240 A	247 A	246 B	246 A	245 B	245 A	244 B		
				\$1F	\$F8 A	248 A	255 A	254 B	254 A	253 B	253 A	252 B		
				\$20	\$0100 A	256 A	263 A	262 B	262 A	261 B	261 A	260 B		
				\$21	\$0108 A	264 A	271 A	270 B	270 A	269 B	269 A	268 B		
\$07	4 A	\$0F	7 B	\$22	\$0110 A	272 A	279 A	278 B	278 A	277 B	277 A	276 B		

would have occurred firstly in those lower block numbers that contained the index pointers (before the text starts), so you might only have lost the first few hundred characters.

In fact if the overwrite file was less than 200 characters (a 'seedling' file) in length, you probably won't have lost any of the text at all and full recovery will be possible, if not easy. This will become more understandable when we look at the different formats taken on by files on the disk, in subsequent articles.

The Volume Directory Block

For starters, let's look at the volume directory block and try to make sense out of the jumble. The format you see in Figure 1 is that produced by Pro-Byter; it has some of the bytes translated to hex figures, and others to ASCII characters. Other disk-inspection programs might look quite different on the screen, but the information contained will be the same — and in the same sequence, since this is the order in which the directory bytes have been read off the disk.

At the top of the screen shown in Figure 1 is a single line containing two sets of

Figure 1. The volume directory block as seen by Pro-Byter. A is the location of the previous block; B is the location of the following block; C is the volume name; and D is the filename length.

```

A — 00 00 03 00
B — F9 DEMO.DISK : 00 0000 0000 000000
C — 0000-0000 00 00 C3 270D 0300 0600 1801
D — 2C ADDRESS.FILEEMP 19 0800 1E00 573800
    FCAC-0000 00 00 E3 7E70 FCAC-0000 0200

    18 SEEDLINGKS.TEMP 1A 1600 0100 4B0100
    FCAC-0000 00 00 E3 0000 FCAC-0000 0200

    00 YC.PRODOSS.TEMP 1A 1800 1000 E01C00
    FCAC-0000 00 00 E3 2000 FCAC-0000 0200

    29 YC.PRODOSS.TEMP 1A 3700 1000 CC1D00
    FCAC-0000 00 00 E3 2000 FCAC-0000 0200

    00 : 00 0000 0000 000000
    0000-0000 00 00 00 0000 0000-0000 0000

    00 : 00 00

    BYTE      VALUE      A BLOCK PART      6
    44($2C)   65($41)    A 2($02)      A      2
  
```

\$07	\$08	\$09	\$0A	\$0B	\$0C	\$0D	\$0E	\$0F
4 A	3 B	3 A	2 B	2 A	1 B	1 A	0 B	7 B
12 A	11 B	11 A	10 B	10 A	9 B	9 A	8 B	15 B
20 A	19 B	19 A	18 B	18 A	17 B	17 A	16 B	23 B
28 A	27 B	27 A	26 B	26 A	25 B	25 A	24 B	31 B
26 A	35 B	35 A	34 B	34 A	33 B	33 A	32 B	39 B
44 A	43 B	43 A	42 B	42 A	41 B	41 A	40 B	47 B
52 A	51 B	51 A	50 B	50 A	49 B	49 A	48 B	55 B
60 A	59 B	59 A	58 B	58 A	57 B	57 A	56 B	63 B
68 A	67 B	67 A	66 B	66 A	65 B	65 A	64 B	71 B
76 A	75 B	75 A	74 B	74 A	73 B	73 A	72 B	79 B
84 A	83 B	83 A	82 B	82 A	81 B	81 A	80 B	87 B
92 A	91 B	91 A	90 B	90 A	89 B	89 A	88 B	95 B
100 A	99 B	99 A	98 B	98 A	97 B	97 A	96 B	103 B
108 A	107 B	107 A	106 B	106 A	105 B	105 A	104 B	111 B
116 A	115 B	115 A	114 B	114 A	113 B	113 A	112 B	119 B
124 A	123 B	123 A	122 B	122 A	121 B	121 A	120 B	127 B
132 A	131 B	131 A	130 B	130 A	129 B	129 A	128 B	135 B
140 A	139 B	139 A	138 B	138 A	137 B	137 A	136 B	143 B
148 A	147 B	147 A	146 B	146 A	145 B	145 A	144 B	151 B
156 A	155 B	155 A	154 B	154 A	153 B	153 A	152 B	159 B
164 A	163 B	163 A	162 B	162 A	161 B	161 A	160 B	167 B
172 A	171 B	171 A	170 B	170 A	169 B	169 A	168 B	175 B
180 A	179 B	179 A	178 B	178 A	177 B	177 A	176 B	183 B
188 A	187 B	187 A	186 B	186 A	185 B	185 A	184 B	191 B
196 A	195 B	195 A	194 B	194 A	193 B	193 A	192 B	199 B
204 A	203 B	203 A	202 B	202 A	201 B	201 A	200 B	207 B
212 A	211 B	211 A	210 B	210 A	209 B	209 A	208 B	215 B
220 A	219 B	219 A	218 B	218 A	217 B	217 A	216 B	223 B
228 A	227 B	227 A	226 B	226 A	225 B	225 A	224 B	231 B
236 A	235 B	235 A	234 B	234 A	233 B	233 A	232 B	239 B
244 A	243 B	243 A	242 B	242 A	241 B	241 A	240 B	247 B
252 A	251 B	251 A	250 B	250 A	249 B	249 A	248 B	255 B
260 A	259 B	259 A	258 B	258 A	257 B	257 A	256 B	263 B
268 A	267 B	267 A	266 B	266 A	265 B	265 A	264 B	271 B
276 A	275 B	275 A	274 B	274 A	273 B	273 A	272 B	279 B

dual hex pairs. The first dual pair (A) tells you where to find the directory's previous block (\$0000 since there isn't a previous block), while the second (B) tells you where to look for the following block.

This main volume directory is always at Block \$02, so Block \$0003 has been reserved for future use. Remember you always need to read dual hex pairs 'backwards' — the least significant pair (\$03) comes first, and the most significant (\$00) comes last.

The first entry in the directory file is the volume name (C), which in this case is DEMO.DISK. We know it is a volume name from the hex number that precedes it (F9).

If you look at Figure 2, you will see that the first part of this hex pair indicates the type of file storage on the disk — in this case, it's a Type 'F' file storage which indicates a volume directory. ADDRESS.FILE below is a storage type '2', which indicates a sapling file of over 256 bytes but less than 128,000(or 257 blocks). Most of your word processing files will be of this type.

The file named SEEDLING is, as can be assumed from the name, a storage type '1'. Its full contents is the sentence "I am a seedling file."

\$0 Inactive file
\$1 Seedling file (1 block)
\$2 Sapling file (max 257 blocks)
\$3 Tree file (over 257 blocks)
\$4 Pascal area
\$D Subdirectory file entry
\$E Subdirectory header
\$F Volume directory

Figure 2. File storage types.

The first of the files named YC.PRODOS shows a storage type '0'. This indicates it has become inactive because it's been re-saved (directly below in the directory).

Whenever ProDOS re-saves a file already on disk, it first creates a completely new copy, and then deletes the reference to the old file. It does not save the new file into the same block as was previously used.

Most operating systems work this way, but it is often not recognised that if a mistake is made, and you accidentally save some incorrect data under an old filename, the original data can still be recovered intact, by using Pro-Byter to make some subtle changes to a few bytes on the disk. It's not just a simple matter of chang-

ing the storage type \$00 to \$29, but we'll get to this later.

The second byte (D in Figure 1) in the hex pair preceding the filename is simply a measure of the filename length. DEMO-DISK measures 9 characters in length, while ADDRESS.FILE is 12 (in hex \$C). On the end of these filenames can be seen the residual of the name APPLEWORKS-TEMP added to the directory by the operating system as a preliminary to saving the file. ProDOS doesn't wipe out the old filenames, it just overlays them and records how many characters are in use with this second byte of the hex pair.

Next month we'll look at the other types of information contained in the ProDOS directory, and find out how to change them. □

HEX NUMBERS

a) Each digit in a hex pair (from 0 to 9, then A to F) represents a decimal number from 0 to 15.

b) A hex pair can therefore represent any decimal number from 0 (\$00) to 255 (\$FF).

c) Dual hex pairs can represent any decimal number from 0 (\$0000) to 65,535 (\$FFFF).

d) From a disk or memory, dual pairs are read 'backwards'. The least significant number comes first — so \$04 followed by \$01, translates to \$0104, which is decimal 260.

e) Remember when you are counting with hex numbers that zero comes first. If a pointer is indicating \$01, it is pointing at the second byte in the series, not the first.

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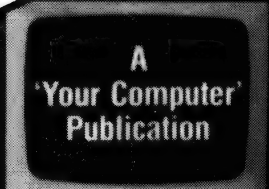
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C

Part 11

FOR SMARTIES

Last month, Les looked at the rudiments of file handling in C. This month, he starts to round out our knowledge of the language, with the first of a number of miscellaneous topics: the C preprocessor.

THE C LANGUAGE, per se, is actually very small as languages go. Many of its features are embedded either in the function library (technically not part of the language) or in the environment in which C operates — often Unix. Examples of the latter include input/output redirection, some of the file handling facilities, and the C preprocessor.

C has an extremely sophisticated macro preprocessor, defined virtually as part of the language. Technically, it's not part of the language, but in practice, all compilers implement at least a major subset of it. In this article, we shall examine the features of this preprocessor.

Definition of Constants

The first use of the preprocessor by every programmer is in the elimination of magic numbers. There are a couple of means of doing this. The first is the `#define` command, which works in three ways.

The use of `#define` followed by a literal (usually in upper case) makes an entry in the preprocessor's symbol table for that literal. This can later be used to control conditional compilation, using the preprocessor commands `#ifdef` (if defined) and `#ifndef` (if undefined).

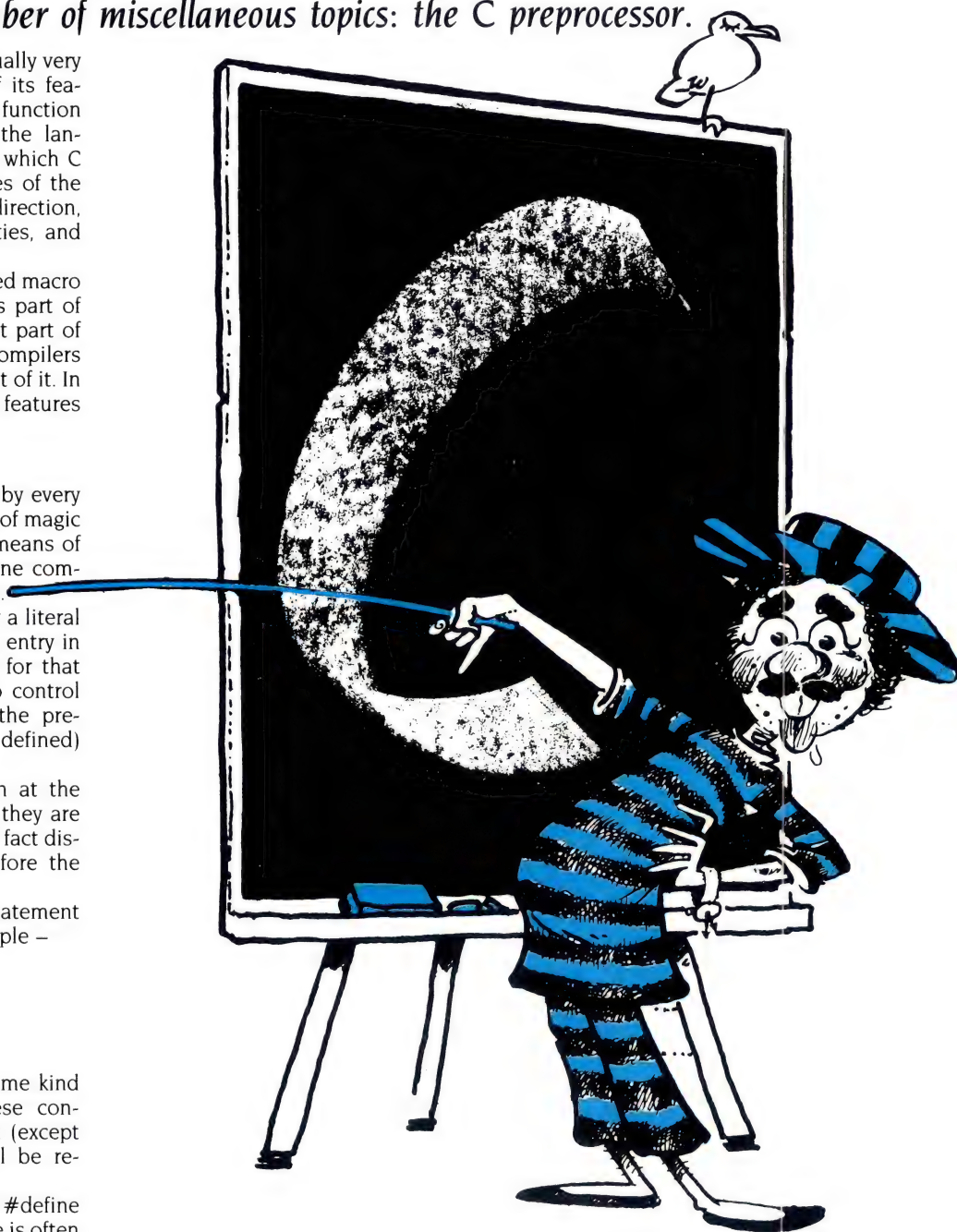
Notice there is no semi-colon at the end of preprocessor statements; they are not part of the C language, and in fact disappear from the source text before the compiler starts to operate.

Another use for the `#define` statement is to define a constant. For example —

```
#define ESC 0x1b
#define FALSE 0
#define TRUE 1
#define RET 'r'
#define VERNUM 3.1
```

All these statements define some kind of constant. Now wherever these constants occur in the program text (except within quoted strings), they will be replaced by the appropriate value.

The most sophisticated use of `#define` is with parameters. This technique is often



used by compiler writers to simplify libraries. Let me give you an example.

The only difference between `putchar()` and `fputc()` is that `putchar()` always writes to the `stdout` stream, whereas `fputc()` can write to any stream. One could write two functions to perform the two functions, but that seems wasteful, bearing in mind the similarity between the two.

If there were just some way to convert all calls to `putchar()` into calls to `fputc()`, we could simply supply `fputc()`. But it's not a simple replacement of text; we have to convert something like

```
putchar(c);
```

into

```
fputc(c, stdout);
```

However, the macro preprocessor is smart enough to handle this. If you simply put the line

```
#define putchar(x) fputc(x, stdout)
```

at the top of the program, the preprocessor will note that `x` appears in both the source and target text, and will treat it as a 'pseudo-variable', thus transforming the text correctly.

A more complex example (from K&R) is the definition of the `max` function:

```
#define max(A, B) ((A) > (B) ? (A) : (B))
```

Lots of parentheses are mandatory, since `A` or `B` in the program text may be expressions in their own right, and omitting the parentheses could upset the order of evaluation. For example, the program line

```
x = max(p+q, r+s);
```

will expand into

```
x = ((p+q) > (r+s) ? (p+q) : (r+s));
```

Many common functions are provided this way; in particular, the character class testing functions (`isalnum`, `isalpha`, and so on) are frequently implemented in this form.

Having defined a constant or macro in this way, you can cause the preprocessor to 'forget' it with the command

```
#undef identifier
```

But back to the elimination of the dreaded magic numbers. Another common trick is to place all magic numbers, macro definitions, and so on, into a header file and read it into the various files which need to agree on the values of magic numbers. For example, if you have a program which is made up of two separate files called `part1.c` and `part2.c`, and they both have definitions like this —

`part1.c:`

```
#define MAXSTR 128
```

`part2.c:`

```
#define MAXSTR 132
```

— you are in for some interesting debugging. In general, `#defines` often specify maximum sizes and upper limits, so bugs will not appear until you start testing those limits. (You do test the behaviour of your programs at their limits, don't you?)

The solution, in this case (it happened to me, though in PL/I, not C), is to create a file containing all the shared magic numbers and `#include` it where needed —

```
magic.h:
#define MAXSTR 132
```

`part1.c:`

```
#include "magic.h"
```

`part2.c:`

```
#include "magic.h"
```

Now both source files agree about the value of `MAXSTR`, and always will, even if you change it.

Such files are called header files, and have a default filetype of `.h`. They may be located in the same directory as the source code, or in the `/etc` directory or somewhere altogether different. In general, lines of the form

```
#include "stdio.h"
```

will cause the preprocessor to look first in the current directory for the header file, while lines of the form

```
#include <stdio.h>
```

will cause searching in a `/etc` directory first. Some compilers have a switch which allows overriding of directory searching in the latter case.

`#includes` should be nestable, but check your compiler for any limitations.

A number of preprocessor lines control whether or not lines are to be passed through for compilation. The basic form of this control is —

```
#if constant-expression
.      (lines of code)
#endif
```

If the constant-expression evaluates to a non-zero value (true), then the code is passed through for compilation. If constant-expression evaluates to zero (false), everything up to and including the `#endif` just disappears.

Notice that evaluation of the constant-expression takes place at compile time, not run time — which is why it is a con-

stant expression: it can't vary.

There are several variations on this theme. The first is to test whether an identifier has been defined (see Figure 1).

```
#if identifier #ifndef identifier
.
.
.
#endif          #endif
```

Figure 1.

Because a medium-to-large program may have quite a few header files `#included` in it, it is possible that some preprocessor identifiers may be defined in several different places. For this reason, you will often see this construction in header files:

```
#ifndef identifier
#define identifier value
#endif
```

In other words, if the identifier is not defined, define it; if it is, leave it alone.

Naturally, since C is a good structured programming language, the preprocessor supports `if..else..endif` —

```
#if constant-expression
.
.
.
#else
.
.
.
#endif
```

As with the `#include` statement, nesting should be supported.

A common construction among programmers who have used the BDS C compiler and some other languages, is to comment out a block of code while testing — see Figure 2.

In BDS C, this will always work, since BDS allows nested comments. However, the UNIX convention does not allow nesting, and therefore most compilers will see the `/*` after the word 'work' as the end of the opening comment, and will compile the `if` statement.

Comments should therefore not be used to remove code from compilation. Instead, `#define` an identifier and use `#ifndef..#endif` to control compilation (see Figure 3).

```
/*
    thisvar++;
    this_func_call(thisvar); /* This may not work */
    if (thisvar > 100) printf("Done\n");
*/
```

Figure 2.


```
#define TEST1
#ifdef TEST1
    thisvar++;
    this_func_call(thisvar); /* This may not work */
    if (thisvar > 100) printf("Done\n");
#endif
```

Figure 3.

Alternatively, don't define an identifier and use `#ifdef`..`#endif` to control compilation. Just don't use comments. (Unfortunately, the BDS C convention is a useful one...)

A convenient ploy for debugging code is to use conditional compilation to control the inclusion of `printf` statements which display the values of crucial variables at strategic moments. It's a major chore entering and then removing such state-

ments, and more than once I have shipped a program to a customer which worked fine except for an embarrassing tendency to sometimes reveal its innermost thoughts.

The solution, in C, is to `#define` `DEBUG` during development, and use `#ifdef` `DEBUG` statements to control the inclusion or exclusion of the `printf` statements. Once development is complete, remove the `#define` `DEBUG`, and recompile, and

the program will magically shrink in size and no longer spill the beans about what it's doing. Leaving the `#ifdef`'s and `printf`'(s) in the code can often speed up maintenance considerably at a later date.

Sometimes you will have to debug a program that's going wrong during the first pass of the compiler. You should be aware that most compilers have a switch which will cause the macro preprocessor to send its output to `stdout`, whence it can be redirected to a file for examination.

In this listing, all the magic numbers will be just that — magic numbers — and some blocks of code that you expect to see will not be there because of a `#ifdef` being evaluated, or something else will appear that you don't expect because of a `#include` you'd forgotten about.

A Practical Example

This month's article looks a bit bare, with no sample programs, so Figure 4 gives an example which illustrates some of what we've been discussing, as well as showing how text files can be processed.

This program, `gloss.c`, searches through a Wordstar document file, looking for words and phrases in double-strike (such phrases have a `Ctrl-D` before and after them). It then creates a file containing the list of such words for use as a glossary. The program is invoked with the command line

```
gloss <infile> <glossfile>
```

The names of the input file and the glossary output file are picked up from the command line using two parameters which are passed to the `main()` function, and which are called `argc` and `argv`. Their use will be explained in Part 12; just accept for the time being that `argv[1]` is a pointer to the input filename and `argv[2]` is a pointer to the output filename.

Notice how the preprocessor is used to define various constants, such as the value of the `Ctrl-D` character as `'004'`.

The main logic simply loops around, reading a character at a time from the input file, and when it sees the `DOUBLE` character it changes a flag called `indouble`. If `indouble` is true, then characters are copied to the output file. When `indouble` goes false, the loop copies the last character (the `DOUBLE` character itself), and then outputs two newlines to double-space the listing.

A very simple little program, but very handy — particularly at YC.

Next month, `argc` and `argv` processing, with application to DOS file attributes. □

```
/*
gloss.c - search through a Wordstar file, and extract all phrases in
double strike for glossary explanation.
*/
#include "stdio.h"
#define EOF -1
#define DOUBLE '\004'
#define TRUE 1
#define FALSE 0
#define MASK 0x7f
main(argc,argv)
int argc;
char **argv;
{
    FILE *infile, *outfile;
    char c;
    int indouble;

    if(argc != 3) {
        printf("Usage: gloss filename.typ filename.typ\n");
        exit(1);
    }

    if((infile = fopen(argv[1],"r")) == NULL) {
        printf("gloss:- cannot open: %s\n",argv[1]);
        exit(1);
    }

    if((outfile = fopen(argv[2],"w")) == NULL) {
        printf("gloss:- cannot open: %s\n",argv[2]);
        exit(1);
    }

    indouble = FALSE;
    while ((c = fgetc(infile)) != EOF) {
        if ((c & MASK) == DOUBLE) {
            indouble = !indouble;
            if (!indouble) {
                fputc(c,outfile);
                fputc('\n',outfile);
                fputc('\n',outfile);
            }
            if (indouble) fputc(c,outfile);
        }
        if (c == '\n') fputc(c,outfile);
    }
    fclose(outfile);
    fclose(infile);
}
```

Figure 4.

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Dataflex 2.1c

Intelligence Australia, (02) 699 3877

Price: Not supplied

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the data being displayed. In addition, the new version allows a Dataflex application to be interrupted at operating system level to execute an external program, such as a separate word processor, without losing the database. This will allow re-setting of communications protocols, printer parameters and so on, 'on the run'.

Disspla/PC

Integrated Software Systems Corp.

(02) 925 0774

Price: \$2800

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Formaster II & Imagemaster

Personal Computer Software.

(02) 923 2899

Price: Not supplied

Formaster II operates in conjunction with the Wordcraft word processing system, and offers full form-design capabilities for use with Canon and HP laser printers; it's mouse-operated, with pop-down menus. The second program, Imagemaster, also runs with Wordcraft, and allows the incorporation of text and graphics on the page before printing. Screen images may be 'grabbed' from other packages, such as Lotus, or read in from a Canon X12 digitising scanner.

Gigafile

Dovetail Data, (07) 352 6792

Price: Not stated

One of the limitations of DOS for PCs has been the 32 Mbyte limit on hard disk partition size. To operate hard disks of greater capacity, they must have been partitioned into virtual disks no larger than 32 Mbytes, and each must have its own drive letter. This new software from Core International allows a single file or volume to expand to 1000 Mbytes (one million characters). The software will be supplied with all Core's new high-capacity drives, 40 Mbyte to 260 Mbyte.



Open Access II

Software Suppliers, (02) 888 1955

Price: Not supplied

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IBM Laptop Software

Imagineering, (02) 662 4499

Price: See below

Imagineering has beaten the gun by announcing software before the machine release. A version of Micro Pro's Wordstar 2000 and Extra Easy have been converted for the new machine, and both carry the full functions of the original versions. Supplied with Wordstar, it retails for \$850; Extra Easy for \$290.

Move It

Jenton Software, (02) 666 3348

Price: Not supplied

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Prime Computer (02) 929 0044

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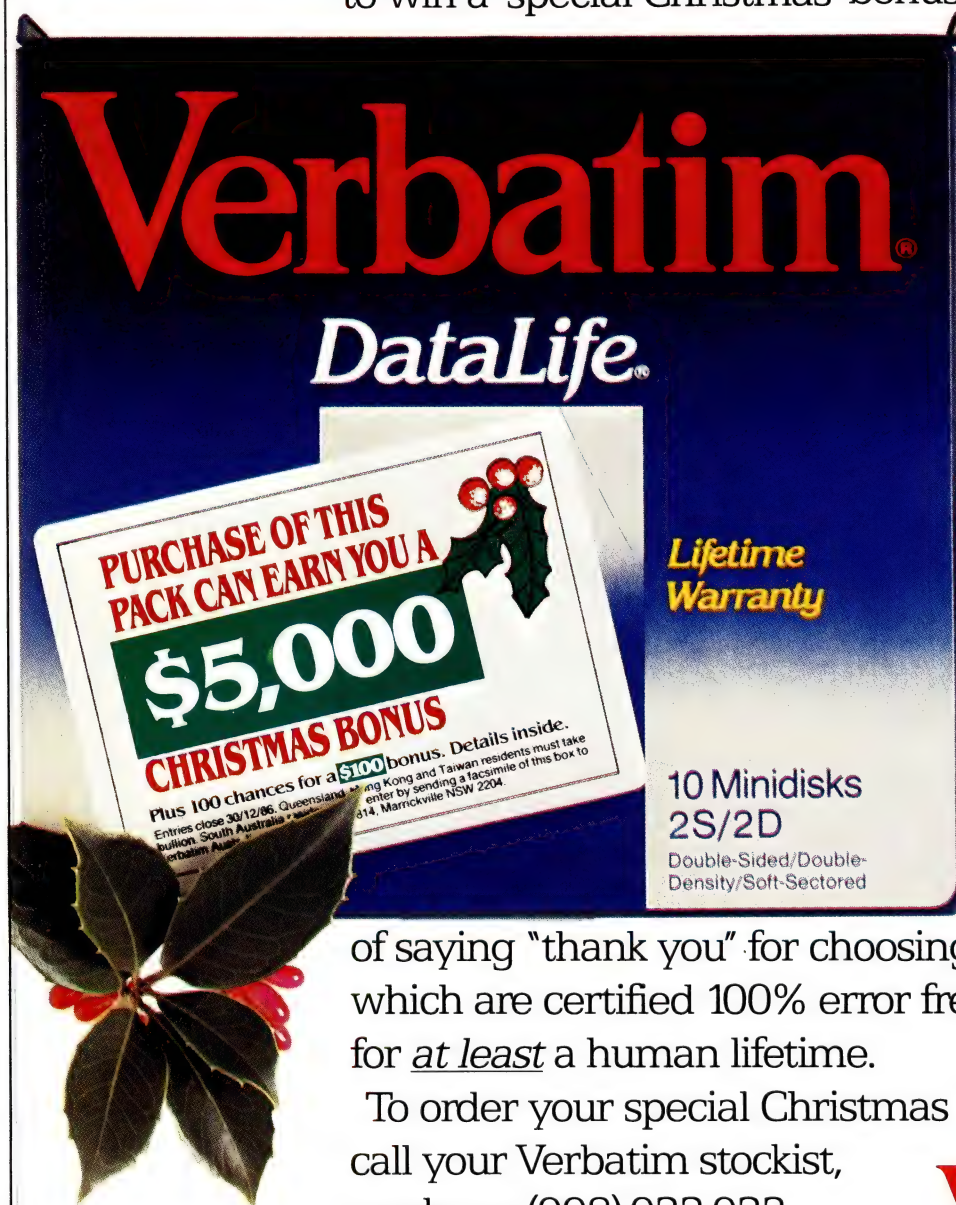
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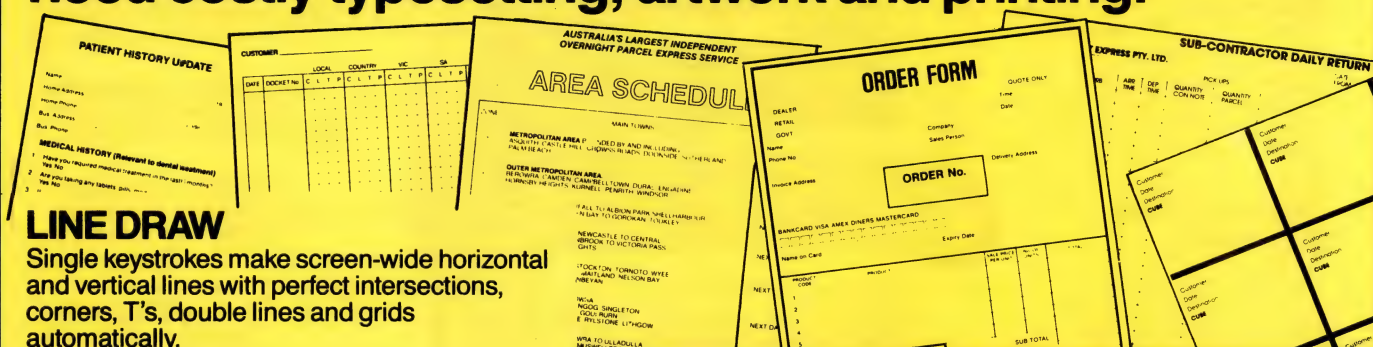
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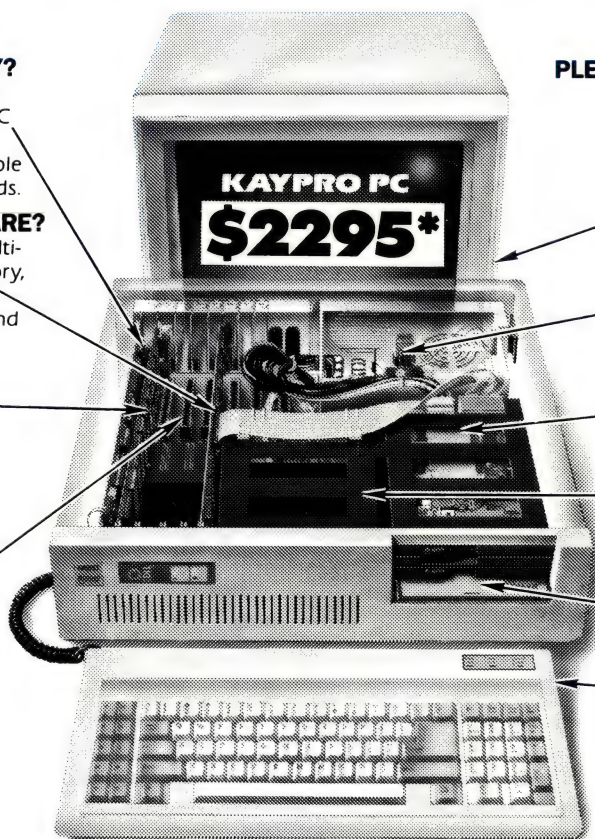
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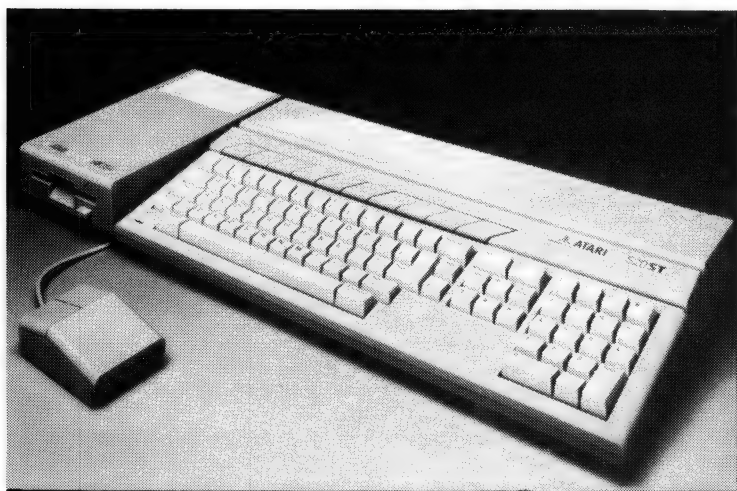
Wordcraft Nova

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(02) 923 2899

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A version of the Wordcraft word processing system, designed for the first-time user, and aimed primarily at companies who need to train typists in word processing skills. Nova comes complete with its own interactive 'help' system and is easily upgraded to the full Wordcraft package. A toolkit (\$275) is also available to allow re-configuration of the software and re-definition of keys for particular applications.



New Machines

Atari 520ST

Mobex, (02) 406 6277

Price: \$1495

The most recent release from Atari is a new 16-bit machine which uses a standard colour television set as a monitor. It comes complete with half a megabyte of RAM, a mouse, pull-down windows and icons. Available Software includes word processors, drawing programs, BASIC, Logo and the GEM operating system. ◁

Ensign II

CMS, (07) 52 9966

Price: From \$13,000

The Ensign II is a low-cost, eight-user, 1Mbyte system with a 25 Mbyte hard disk, which can be expanded to a 48-user super-system with 840 Mbytes of on-line storage. The system comes with Unix, providing both multi-user and multi-tasking with UniPlus+ from UniSoft. A wide variety of high-level languages is available for easy application development.

Apple Serial to Parallel

Byte Electronic Controls,

(045) 77 6203

Price: \$149

Designed and produced in Australia, this converter allows the Apple IIc to interface to any parallel printer. In the past, Apple users have been hampered by limitations in the printers they could use, so this device should find a ready market. Plugging into the Apple's printer port and drawing power from a supplied 9 Volt plugpack, it offers baud rates from 300 to 19,200, and an on/off switch for the eight-bit data. Other models are available for the Macintosh.

Network/Comms Board

Novatech Controls, (02) 758 1122

Price: \$411

The new COM-485 board from Metrabyte allows PCs, XTs, ATs and compatibles to be networked over the RS-485 bus. This allows multiple transmitters and

receivers over a two-wire bus, letting 'party line' networks evolve. COM-485 stations can be up to 4000 feet apart, and applications include networking instruments, scanning and updating various user input and output devices and any other communication application that requires more than one device to be networked.

Glass Typewriter

Triumph Adler, (02) 888 7644

Price: From \$3275

The Glass Typewriter converts any standard TA electronic typewriter to a keyboard and printer for a sophisticated word processing system. The operator needs no conversion training, and the typewriter can still be used as a standalone unit. With standard 360 Kbyte floppy and your choice of amber or green monitor, it seems a reasonable way of extending the life of that dying breed of animal, the typewriter.

Peripherals and Extensions

Ampex Terminal

Datascape, (02) 969 2699

Price: \$1195 ex. tax

Designed for the PC multi-user who needs top performance at a reasonable price, the Ampex terminal features a choice of PC or AT keyboards, 36 cm amber screen with 132- or 80-column display, 10 programmable function keys and the choice of IBM scan codes or ASCII codes. The Ampex can be run in Televideo 925 emulation mode on computers other than IBM.

Hypervid Video Board

Hypertec, (02) 819 7222

Price: \$1450

Australian add-on board manufacturer, Hypertec, has announced a new multi-function board for IBM PCs and compatibles. It includes enhanced graphics support, 640- by 350-

pixel colour display capability, 256 Kbytes of video memory, 512 Kbytes of RAM, a parallel port, two serial ports and a clock/calendar. Software includes a print spooler, RAM disk and disk caching. Free up those slots for important add-ons.

J Series Terminals

Ferranti Australia, (02) 698 5544

Price: Not stated

This new series of terminals from Ferranti is user-programmable and based on Zilog microprocessors. They can be interfaced with any computer family and are said to be true multi-emulator terminals. Data information systems (Viatel, Reuters, Telex and so on) can all be provided in one casing. Other features include 360-degree screen swivel, 25-degree tilt, and screen control incorporated in the keyboard.

Miscellaneous

Aironic 2000

Email Westinghouse

Price: About \$400.

I have no desire (puff puff) to join the anti-smoking lobby, but I agree that others, including computers, deserve consideration. This new filter is capable of treating 142 litres of air per second and is thus able to control air quality in a room of up to 60 square meters, filtering out particles as small as airborne bacteria with 99 per cent efficiency.

Bluff Your Way in Computers

Australian Bluffers Guides,
(03) 699 5000

Price: \$4.95

A new book in the series of Bluffers Guides, to give the novice a decided edge in computer-related conversation, this book explores many facets of computers, from CPU through to industry buzzwords. Behind the frivolous title, the books are said to contain valuable information.

Electronic Flasher

HPM Industries

Price: \$16

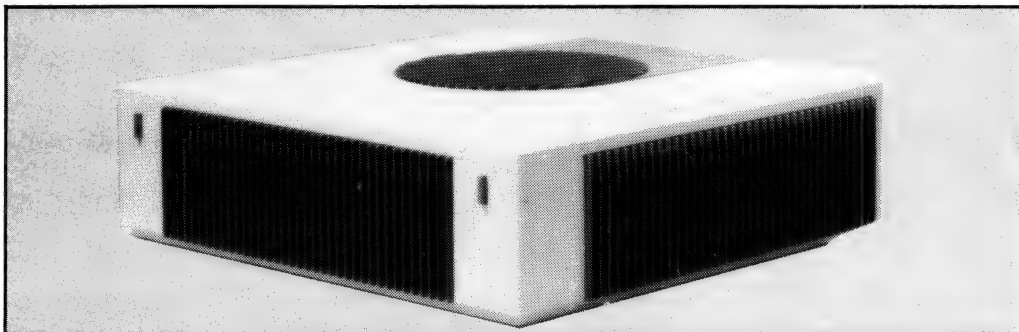
I thought an electronic flasher might be a computer which jumps out from behind trees with its disk door open, but no, it's a device to be fitted over important switches, to warn against turning the switch off. Simple to fit and remarkably inexpensive, it has a real place in an office or factory situation where electrical gear is left running unattended and it's important that it isn't switched off.

Polaroid Floppy Disks

Polaroid Australia, (02) 887 2333

Price: See below

Just spilt a cup of coffee on your data disk? If it's one of the new Polaroid floppies, you don't have to panic ... yet. Just send it back to Polaroid and the rescue squad will extract virtually all the data at no charge. Most common accidents don't render data lost forever; data can be recovered from disks affected by numerous substances, from coffee to ink, sticky fingerprints and even ketchup and mustard. One United States



AUSTRALIAN BLUFFER'S GUIDES

magazine even had data retrieved from a disk it had frozen and then thawed in a microwave (only in America). For all this, how much? Polaroid disks cost less than many high-quality disks on the market today. The following prices, quoted by Polaroid, are recommended retail prices, though many large chainstores are already offering the bottom-of-the-range diskettes for as little as \$20 a box. Recommended prices are: \$36 per box of ten 13 cm SSDD disks: \$38 for DSDD; and \$43 for DD

Quad disks. Users of 20 cm disks have not been forgotten with 48-track SSDD disks selling for \$60 a box, and DSDD for \$62. (Would my son please note that Mr Polaroid says sticky fingers are the worst problem?)

Disaster Recovery Service

Comreco, (03) 241 1944

Price: Not supplied

Comreco is a professional computer recovery company, providing a complete range of disaster/disruption services. Few major users have any plan for recovery of plant and/or software after a disastrous loss by fire, flood, lightning, sabotage or impact by motor vehicles, to quote just a few of the reported computer losses in Australia. Comreco will analyse your recovery needs, establish an acceptable strategy, design a disaster recovery plan, test it and manage the testing schedule.

RF Suppressor

Novatech Controls, (02) 758 1122

Price: \$89

This new device helps eliminate the RF noise generated by appliances such as television sets, which upsets other devices, such as computers. Based on the principle that RF problems arise from the originating device using its cables as aerials, this simple choke clips onto those aerials and reduces the interference without affecting the operation. Beats having to move the computer out into the parking lot.

GPA Supermodem

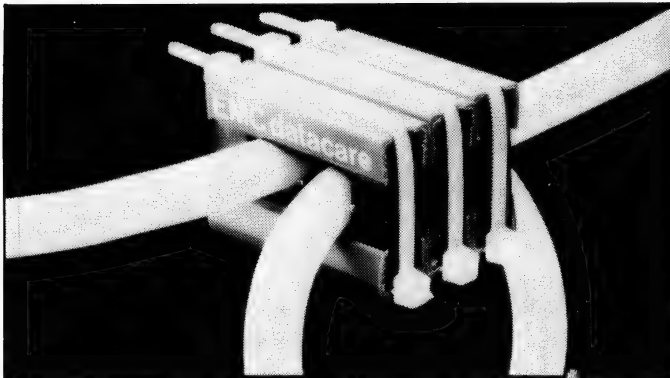
Micro-Educational, (049) 26 4122

Price: \$395

Another all-Aussie development, this super-modem features a bus-expansion system for various cards due to be released soon, including a V22 1200/1200 full-duplex card, a 2400/2400



NEW PRODUCTS



card, speech recognition card, a 256 Kbyte RAM card and a Videotex card with RF output for display on a standard TV. All the usual smart features are incorporated, including auto-dial, auto-answer and auto-disconnect, plus Hayes AT command set and V21 and V23 protocols. The auto-ranging feature allows the modem to automatically determine the baud rate of the host.

The Button

Talisman Trading Co, (02) 438 4848
Price: \$29.95

This extremely simple little device plugs into your power circuit at any power outlet on that circuit, and protects all equipment in use against damage caused by surges in the power supply. It responds instantly on sensing a surge, and consumes no power itself.

Spellprompt

Brother Industries, (02) 887 4344
Price: \$399

An add-on device for the Brother EM & CE professional typewriter range, the Spellprompt attaches to the typewriter and offers an electronic dictionary with over 70,000 commonly used words. A further 300 words may be added.

PC-Xbus

Alloy Australia, (03) 277 1333
Price: \$2400

So you've got a hard disk, a bus mouse, a multi-function card, a modem, and now there's no room for the additional cards for the new LAN you've planned? Don't despair, get a PC-XBUS — this will give you a further 12 slots (and its own high-capacity power supply). It plugs into a short slot on your IBM or compatible, and will handle any existing PC expansion available. The 225 Watt power supply provides 35 amps at 5 Volts and has two cooling fans.

Type-right Tutor System

Dick Smith Electronics
Price: \$69.95

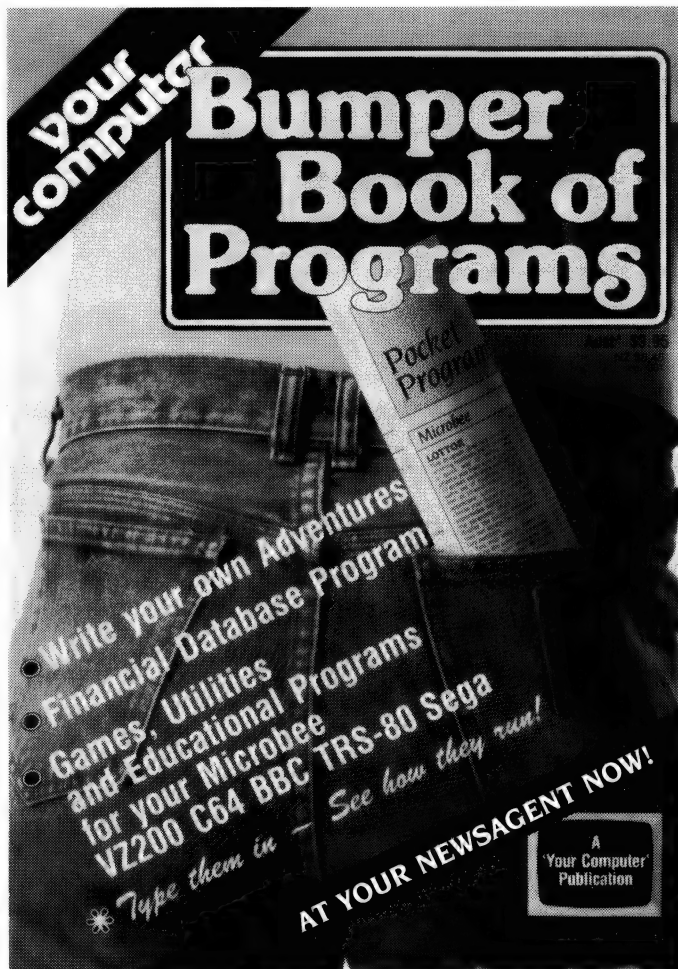
A typewriter that doesn't. The keyboard looks familiar, but there's no roller to feed the paper on. This is a touch-typing tutor which lets you tap away for hours without wasting paper, and tells you when you make an error. It has built-in ROMs to guide you, step by step, starting with where to place those 10 thumbs we all seem to have when we first touch a typewriter. I really muts consider one soon.



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Mode to Measure

One of the most versatile of all the DOS external commands is MODE. It is to be found on your DOS disk as the file MODE.COM. With it the PC video can be switched from a mono display to a colour board, from 40 to 80 columns, and the colour graphics adaptor can be toggled from RGB to black-and-white.

More importantly, MODE also allows a selected serial port to be configured for all the significant parameters — speed, parity, word length and stop bits. Why bother, when communications packages handle all these details of the communications protocol for the user?

Remote Control

The DOS commands CTTY and COPY can be used for communications and connection of remote terminals to a host PC, and MODE itself can be used to redirect output bound for a parallel port to a selected serial port. First, however, MODE must be used to initialise the port parameters.

To set the first serial port to 300 bits per second, even parity, 7-bit word length and one stop bit, the command is:

```
MODE COM1:300,E,7,1
```

When the serial port has been thus initialised, you can use it for a few little tricks.

A not uncommon need is for people within one organisation, but at different sites, to use common information. It is possible to share this information without going to the expense of a LAN, particularly one which supports a remote site over a phone line. This isn't multi-tasking, so the users will have to take turns.

Programs like Remote and Carbon Copy allow for remote control of a PC. The DOS command CTTY, introduced with DOS 2, is

another way to achieve remote control for a smaller range of software.

DOS takes input information from the keyboard and sends the display to the screen. CTTY AUX diverts both to the first serial port, as does CTTY COM1, while CTTY COM2 uses the second serial port. Returning control to the host keyboard and display to the host screen is done with CTTY CON.

Now a remote terminal, at the other end of a serial cable, even at the remote end of a phone line with the aid of modems, can run a host PC. The remote terminal could be a PC running communications or terminal emulator software. All the standard DOS commands will work from the far end, and most non-graphics software runs successfully. There is only one limitation — the software being run on the host must be, in IBM's terminology, 'well behaved' and use DOS function calls for input and output. Software which writes directly to the screen, such as BASICA and Lotus 1-2-3 will bypass CTTY, but Remote and Carbon Copy have a few tricks to get around these problem programs.

Why bother with remote control? Take a couple of examples: a major document under Wordstar 3.3 requires minor revision by a remote user, or a remote user needs to check or amend a database under dBase II or Dataflex.

It's much easier to make a few small changes to a remote large document than send it over the phone one way, modify it, and then send it back by phone; it's much safer to have only one version of the database in use. Just a few keystrokes are all that need to be sent, instead of requiring two-way transmission of a couple of

megabytes of database. And the risk of having two minutely but significantly different versions of the same database at the two sites is eliminated!

Patches and Installation

Wordstar 3.3 works fine with CTTY COM1; just patch it to write serially to the screen as detailed in this column in June, 1986.

dBase II (version 2.41) works well with a remote terminal running standard communications software, after being installed for an ADDS Viewpoint terminal.

Dataflex is a little more of a problem. It comes in various flavours, and not all will support serial addressing to the screen. Try an MS-DOS (not PC-DOS) version. Even then it will probably expect a terminal with direct cursor addressing. In this case the PC at the remote end needs to be running communications software which will emulate one of the popular terminals (say a VT-52), and not just a glass teletype.

Many other packages can be used remotely — you'll have to experiment.

More Tricks

Want to lock off the keyboard and screen during a batch file? Try CTTY NUL — just don't forget to have CTTY CON later in the file or you'll need the Big Red Reset to regain control. If you are stuck with a serial printer and software which only uses the first parallel port, divert the output to that serial port with the command:

```
MODE LPT1:=COM1
```

DOS has a host of little goodies hidden away in the most mundane commands — look around that manual and see just how many acrobatics you can make your PC perform! □

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Playtime

THIS COLUMN SEEMS to have been rather hung up on software for the past few months, so this time we'll spend a bit of time away from the keyboard, among the toys in the playroom. Two decades ago, the one thing most children probably had in common was an awareness of Mickey Mouse. These days (thankfully) it's more likely to be the experience of using Lego. Although I'm a bit too old to have grown up with Lego I've never been averse to clicking the odd few blocks together, and can do a nifty crane on wheels in next to no time.

At times it gets pretty hard to justify this sort of enthusiasm to my kids who, after all, were supposed to be the ones the stuff was intended for. It got so bad for a while that I was sneaking bits from under their beds while they slept, just to complete my latest mechanical fantasy. Pandemonium in the playroom was averted, however, when I remembered about the user port on my BBC micro. It turned out that all I needed to say to the kids was that I was going to control a Lego model with the computer. Suddenly any part I wanted was mine for the asking!

The user port connector is one of those forgotten connections on the Beeb's bottom. To use it you'll have to splash a few dollars on some hardware and rescue your soldering iron from oblivion, but first let's check what the Lego system needs.

The Engine

There are two Lego electric motors, one running on 4.5 V, the other on 12 V. For the present I'll assume we're using the smaller motor, though with care either or both can be controlled the same way. The 4.5 V motor uses about 300 mA when running normally and around 700 mA when stalled. This is beyond the capabilities of the user port's +5 V supply, so an external supply is necessary. I — or at least my kids — use three NiCad cells, which are safe and, in the long run, cheap.

If you switch the 4.5 V with a medium-sized power transistor (TIP31, 2N3054, and so on) you won't have to worry too much

about heat sinks, unless you're particularly prone to stalling your models, but at 12 V they'd be essential.

To control the power transistor, I chose opto-couplers rather than direct connections. The simple truth is that my faith in the kids' ability to double-check wiring just isn't strong enough to face the thought of freshly-charged NiCads getting mixed up with the innards of my Beeb! At less than \$2, a 4N28 is cheaper than a set of new computer innards. The opto-coupler drives the TIP31 via a general-purpose NPN transistor.

Back at the computer end of things, the user port is actually the "B" half of a 6522 VIA, giving you eight bi-directional lines. These lines can handle only about 1 mA, so to lighten the load I used another general-purpose NPN transistor to drive the opto-coupler. The power for this can be taken from the port's +5 V supply.

By Lamplight

To make your model interact with the computer, some kind of input device is also required. Most appealing to both the kids and myself was a light-operated switch. Two of those small technical Lego-blocks with a hole through them can be used to mount the components, though the holes may need a bit of drilling out. Fit a phototransistor (MEL12) in one and a small 4.5 V or 6 V pre-focused lamp in the other. The advantage of this kind of mounting is that they can be aligned very accurately. I'd have preferred to use a LED, but I couldn't find one bright enough to switch the MEL12 reliably. Again, a small NPN transistor helps things along.

Our first project, a light-activated boom gate, worked well. A car was pushed along until it broke the light beam. This told the computer to turn on the motor for a second and the boom opened. There was only one hitch — we couldn't get the gate to close!

At present I'm adding a relay, operating from a second output line, to switch the supply polarity to the motor. Oh yes, and there's the second switch to tell the computer to close it after the car has gone

through, too. That will require alterations to the software that runs the model ...

The playroom now looks like an electronic disaster area and, judging from the level of enthusiasm therein, is likely to remain so for some time yet.

Operation Software

Software to operate the port is pretty easy to put together. First you must define which lines are for input and which are for output. I used lines 0-5 for output and reserved 6 and 7 for input. (In the circuit diagram only lines 0 and 7 are shown: the rest are simply more of the same.) The user port is located at &FE60. The lines are configured as either inputs (0) or outputs (1) by writing to the port's data-direction register at &FE62.

For more details on programming the user port you'll have to wait till next month or consult chapter 22 of the Advanced User Guide.

To get things started, initialise things with ?&FE62=63 (this defines PB0-5 as outputs, PB6-7 as inputs) then use ?&FE60=1 to turn PB0 on, and ?&FE60=0 to turn everything off again. Selected lines can be changed without upsetting other lines using the AND and EOR functions.

Obviously Lego isn't the only thing you can control via the user port. For accuracy and strength, Fischertechnik models are pretty hard to beat. If you have \$550 to spare they will sell you a nice robot arm kit complete with BBC interface and software. This kit uses chopped light beams to provide position feedback for each of the three motors, and is accurate enough to pick up eggs and place them in egg-cups without damage. Controlling model trains is another obvious application. It isn't anything new, but you could sure have some fun writing an operating system for a layout.

To me, the biggest challenge isn't in the electronics of the interface, but in developing a control language that kids can use. Logo would be a good starting point, but patches for BBC versions of the language to enable control of the user port haven't been too common in these parts of late. Any ideas? □

ASCII-to-SCREEN Code Conversion

ON ALL 8-BIT Commodore models, the screen display is generated from an area of RAM known as screen memory. The 64 (and subsequent models) also has a separate colour memory. Screen memory uses its own special set of character codes, quite different from the ASCII codes the computer uses in its normal processing. In practice, screen codes are something you will rarely need to bother with. BASIC's PRINT statement takes care of all the necessary conversions, and even updates the colour memory as well. However, sooner or later you may find you want to bypass the PRINT statement and directly insert characters into screen memory.

At the simplest level, direct screen access is very easy. The screen memory is no different from any other memory location, and you can POKE to it in the same way that you can POKE to any location. The only *proviso* is that numbers POKEd to screen memory are interpreted as screen codes, as well as maps of the video and colour memories. The top-left corner of the screen is location 1024. To POKE, say, the character 'A', simply look up the screen code for A (1) and POKE it into location 1024.

The difficulties start when you can't predetermine what characters you will want to POKE. This can happen when writing a program where you will want to poke a message determined by user input. In this case the computer will have the message, but it will be expressed in ASCII, not in the screen code. If you poke those ASCII codes to the screen, you will see something, but it won't be the correct characters.

At first sight the need for two separate character codes might seem a little obscure. After all, the complete set of Commodore characters is represented in CBM ASCII. However, on closer examination you will find the ASCII codes only provide numbers for the un-reversed shapes of characters. The rest of the ASCII codes cover *unprintable* characters — characters which don't usually produce any shape, but do have indirect effects on the appearance of the screen; that is, those which change character colour, or switch on reverse mode, or force a carriage return.

The SCREEN codes have to be different because they have to have a unique code for all character shapes in both normal and un-reversed forms. The screen code is actually an index pointer that the 64 uses

```
1 for a=0 to255: x=a
5 if x>127 then x=x and 127: goto 40
10 if x<96 then 30
20 x= and 223: if x<>0 then 40
30 x=x and 63
40 poke 1984, x or 128:print tab(2) x,a:next
```

to find the eight bytes which make up the character's shape. If you ever wanted to write text onto a hi-res bit-mapped screen, you would need to access the character-shape data. That's another good reason to have a routine to convert from ASCII to screen code. The conversion routine in Listing 1 works with all ASCII codes except pi, which, for some obscure reason, is a special case. Pi is ASCII 255, but screen code 94.

The number 1984 is the bottom-left corner of the screen, so it's a good idea to position the cursor at the bottom of the screen before running this program. As it runs, you should see the character shape on each line, the screen code value (x), and the ASCII value (a). Note how ASCII codes 0 to 31 produce reversed alphabetic letters. They are control codes and are normally un-printable, but you can make them appear by typing Control-A, -B, -C and so on, inside quotes.

AND, OR

The routine in Listing 1 employs both AND and OR statements. These BASIC operators can be extremely handy, but are too often under-utilised. The trick to using them is to think in binary. The 8 bits in a byte are numbered 0 to 7, with the 7th bit being the most significant. An easy way to remember which bit is which is to think of the powers of 2. $2^0=1$ and $2^7=128$. The maximum value you can store in one byte is 255, and 255 equals:

$$2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0$$

or

$$128 + 64 + 32 + 16 + 8 + 4 + 2 + 1$$

When two numbers are ANDed or ORed, the equivalent bits are compared and the outcome sets the same bit in the result.

AND places a 1 in the result if both comparison bits are 1; for example, 255 AND 127 results in 127 because the 7th bit (equal to 2^7 or 128) was masked out.

OR has the reverse effect. If either bit is a 1, the result is a one; for example, 255 OR 127 will result in 255, since the 7th bits were 1 and 0 so the result was a one. The order in which you place the numbers has no effect on the result.

The general rule of thumb is to use AND when you want to turn off a bit. You set the mask value so the bit you want off is a zero. This means no matter what you compare to the mask value, the bits in the mask which are zero will result in a zero.

OR is generally used to switch on a bit. In this case you set the desired mask bits to a one. No matter what you compare to the mask value, the bits in the mask which are one will result in a one.

XOR

BASIC 7.0 on the 128 offers an additional command, XOR or exclusive OR. This command means that if either the mask bit or the comparison bit (but *not* both) is equal to one, the result will be a one. Its most common use is to reverse the status of a bit. If you wanted to make a particular screen character alternate between reversed and unreversed modes, you would XOR the value with 128 ($128=2^7$). In other words, only bit 7 is affected. Each time you XOR, the screen

code will result in the opposite of its present status. This is exactly the technique the 64's kernel uses to flash the cursor. □

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Apples and Wombats

I REFER TO your article 'Apples and Wombats', in the July Edition of *Your Computer*.

I am writing to correct two errors in the article, one factual and one legal. I do not wish to be pedantic (a failure all too common in lawyers) but the matters raised, at least the legal one, have very important implications to the computer industry.

First, the factual mistake. You suggested that the "truth" of the Apple ROMs was that they contained a program which was mostly Microsoft BASIC with common algorithms and a little original material added by Apple.

In fact, the Apple case involved two programs. One, the 'Applesoft' program is the language program, which is 10 Kbytes long and is, as you say, substantially built around a Microsoft program (a version licensed to Apple). There was no secret to this, it was disclosed by Apple at the beginning of the proceedings.

However, there was a second program. The 'Autostart' program, the booting and main structural program, including a mini compiler, which was entirely written by Steve Wozniak (very recently the original program notes in Woz's handwriting — some in binary notation — were uncovered in the back of his garage). I do not think you would suggest that just because the program was short that its creator should be deprived of protection from copy — theft — but when you add that, because of the demands of those memory expensive days, the program was skillfully written to cram so much functionality in so short a space, it seems even fairer that the programmer's effort should be protected.

Second, the legal matter. You seem to suggest that because the Applesoft program was based on pre-existing matter and common algorithms, that this was a secret which should have denied copyright protection to Apple.

This is to misunderstand copyright law — and to misunderstand one of the reasons why copyright is the ideal protection for computer programs (and, indeed, why computer programs are ideal subject matter for copyright protection).

Copyright is not concerned with original ideas. It is concerned with how a particular author first puts together an arrangement of words and phrases. These words and phrases

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need not be original, only put together in that way for the first time by the author. So, when an anthologist puts together a collection of Australian poems in a book — only adding the order of the poems and maybe a few words to join them up — the anthologist enjoys copyright in his anthology, just as the poets who supplied the individual poems continue to enjoy copyright in their poems.

How appropriate this is for the way programmers (and lawyers) write. So often, the skill of programmers is in putting together familiar routines in a new order to achieve a particular result. Their skill is in getting the result with the order of events they chose to write. I think it is fair that they enjoy copyright protection against direct theft of the same ordering of routines — nobody would claim breach if a common routine were used in another place, so there is no threat of abuse of the right.

This is so different from patent law, involving a costly and lengthy registration procedure, which is concerned with novel ideas, however expressed. Under patent law, most programmers (and other authors) would enjoy no protection at all.

I hope these comments clarify the matter.

Peter Knight,
Abbott Tout Creer & Wilkinson Solicitors
SYDNEY 2000.

Singapore Sling

I FEEL THAT I should write to inform you, and your readers, of the exceptionally poor quality of software I purchased from one Mr. Albert Lee in Singapore, via an advertisement in the Market Directory of your magazine.

The advertisement, placed by MicroWorld, offered software at \$7 per disk. The warning lights were already flashing, but my depressed financial state, and need of a few bits and pieces tempted me to give them a go. The catalogue contained every piece of software I had ever heard of, and then quite a few, and all for \$10 (Singapore currency). Then came the plusses; plus handling charge, plus postage, plus the cost of the manual (if you want it, and also subject to its own handling charge and postage-per-unit weight.) A request was also made, after the order was sent, for all future orders to include \$10 (Australian), as a bank clearance charge, for the privilege of paying by bank

cheque(personal cheques are not accepted!).

All this was quite enough to put a sour taste in my mouth, but then when the goods finally arrived, they turned out to be bads. Sixty per cent of the software failed to operate. By Murphy's Law, it was the same software I had paid extra to get manuals for. An enclosed note told me that if I sent details of any failed software back to them, I could receive a *credit* of \$3.50 for each failed disk! Now we come to the manuals. One manual I had paid \$2 (\$1.40 Australian) for, plus handling charge, and 20 grams worth of postage, turned out to be a single, badly blurred, photocopied sheet, which was completely useless. Another manual, somewhat more substantial, was in unbound, looseleaf format, without holes to allow it to be put into a folder, and was incorrectly (randomly?) collated.

Bargain hunters beware! Proceed only if you have masochistic tendencies.

Glen Thornley,
MALVERN 5061.

Booting MSX

I WAS VERY interested in your September series of articles on future trends in computing, but regret that you joined the ranks of those putting the boot into what is presumed to be the corpse of MSX.

The MSX concept was grand. It would be ludicrous if someone seeking to enjoy a range of music from classical through jazz to rock had to employ a dozen different turntables and tape decks. MSX sought to extend latitude, flexibility and economy to the home computerist by introducing the same compatibility we expect from our audio and video gear.

Matt Whelan documented the success of IBM and its emulators in developing computerware around a common standard. Eventually, as David Hobbs points out in similar vein in the July edition of *Online*, it was the software that sold the machines. Now we see the re-release of the Commodore 64.

No one would seek to stem the tide of progress but, as Hobbs writes, "Why buy a 'Gee Whiz' machine when all the software you really wanted to run was set up for the old machine?" You may argue that Commodore has done all this with the 64, but MSX promised to offer all the advantages of the 64, together with a choice of hardware and standard peripherals. I feel that MSX deserves support as long as it remains in production.

James Crichton,
YOUNG 2594.

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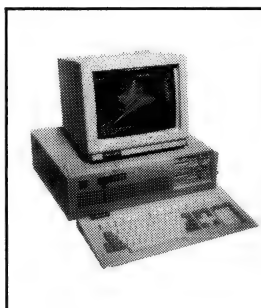
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FLAVOUR OF THE MONTH lately always seems to be co-resident utility software. Sidekick, the well-known, pop-up desk accessory, led the way in the commercial arena. Many authors of public domain and user-supported software have also written co-resident packages. Now comes a user-supported pop-up desk accessory — PC-Deskmates.

Like Sidekick, PC-Deskmates offers a notepad, calendar, calculator and phone dialler. In addition, it provides access to common DOS commands from inside your application, typewriter emulation, an alarm clock and printer control. While there is no internal ASCII table, this function is provided in the form of a file on disk, which can be read with the notepad.

The overall design is clean and consistent — right down to an installation program to set up screen defaults, reset the hot key and print out the manual! Function keys are extensively, and consistently, used in the main program.

The Features

The notepad is a simple editor — not a replacement for a word processor; it really only allows making simple notes while working on other projects. Four files are predefined on disk, and can be read by Notepad; these provide an ASCII table, metric conversion data and (not quite so useful) a list of United States public holidays and ZIP codes.

Typewriter emulation is one of those functions easily overlooked, but very useful. How often have you sent (or received) a letter clearly prepared with a word processor and top-quality printer, encased in a handwritten envelope? How often have you sent out a handwritten bill? It's a pest to get out a typewriter for a single task, and a pest to do it with a computer and normal software. The typewriter mode overcomes this by clearing part of the screen, displaying a ruler line and allow-

ing the setting of tabs. It can be set to print each character as it is typed, or to print a line at a time. Just like a real typewriter, all the line breaks are the user's responsibility and a 'bell' rings when the right margin is neared.

The calculator is decimal only, no binary or hex, but it has a memory, and also displays a simulated 'tape' of the last dozen or so entries on screen. Pressing the F4 key while in the calculator prints all subsequent steps in the calculation onto your printer!

The calendar defaults to showing the current month, but can be scrolled to any year (within a reasonable range) or month. An appointments pad can be set up, and the appointments in the month shown on screen are displayed.

Want to reset your printer to expanded, compressed or other type? The printer-control function allows all this at the press of a key, along with disabling/enabling Printscreen, and switching the printer port between LPT1, LPT2 and LPT3. When started, PC-Deskmates looks for a file PRINTER.CFG; if it isn't found, the default configuration is that of the IBM Graphics printer. Three configuration files are provided for dot matrix printers, and making your own is quite easy.

Time can be constantly displayed in the top-right corner of the screen, using the alarm clock function which will also allow for resetting of the system date and time. The clock can beep on the hour if desired, and if an alarm is set it also displays a user-defined message. The alarm can also be used to start predetermined programs, including batch files.

DOS Commands

Probably the program's most useful feature is the availability of the most common DOS commands from a pop-up window within any application program. These include a vestigial Chkdsk, plus the

ability to change default directories, display directories, type, print, copy, erase and rename files. Just take care not to alter any file your current application is using — it might get confused.

Compatibility

I have used PC-Deskmates with a variety of character-based software without any apparent conflict. As with all pop-up software, care is essential to avoid popping up while the screen is in graphics mode. Right now I am using Microsoft Word in character mode, with no problems. The only problem experienced was a lock-up when I had Sidekick and PC-Deskmates active simultaneously. As always when using co-resident software, the advice is to proceed slowly and confirm positively that the combination is totally reliable when used on *your* equipment.

The Disk

PC-Deskmates comes as a diskful of files; there is Deskmate.com, plus a host of configuration and notepad files. Also on the disk is the excellent manual, ready to be printed out. On my disk, this manual had been compressed with ARC, so you may also need a copy of that program to retrieve the manual.

Availability

In Australia copies should be available from most user groups, for \$10 plus postage, which covers the cost of the disk and copying. If your group does not have PC-Deskmates available, try the Sydney PC-User Group at Box 5010, GPO Sydney 2001.

PC-Deskmates is the product of Alternative Decision Software, PO Box 307, Lancaster, NY 14086, USA. The company has released it as user-supported software, encouraging worldwide copying. Users are asked to register their copies, and the fee is \$US25, payable direct to ADS. □

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All Contributions: should include your name, address, and home and office phone numbers (in case we need to check details). Each page of your submission, and any material sent with it, should also carry your name.

Contributions by Telephone: Contributors who have modems and suitable software (in the MODEM7/YAM mould — see our stories on Christensen Protocols in the May and June 1983 issues) can arrange direct transfer to our computers through our Bulletin Board system, which is on-line 24 hours a day, seven days a week. Contact our office by phone for details on transferring material in this way.

Contributions on Disk: Contributions can be accepted in most disk formats, although some have to be converted outside our offices, which will add to the (often lengthy) delay between receipt and acknowledgement. The preferred medium is IBM standard format single-sided, single-density, 20 cm CP/M disks or IBM PC-DOS minifloppies. We can also handle, in-office, most soft-sectored 13 cm disks, thanks to PC-Alien — so unless you have a particularly strange format, send it on disk straight from your machine. Please pack them extremely carefully if posting and label all disks with your name, address and phone number.

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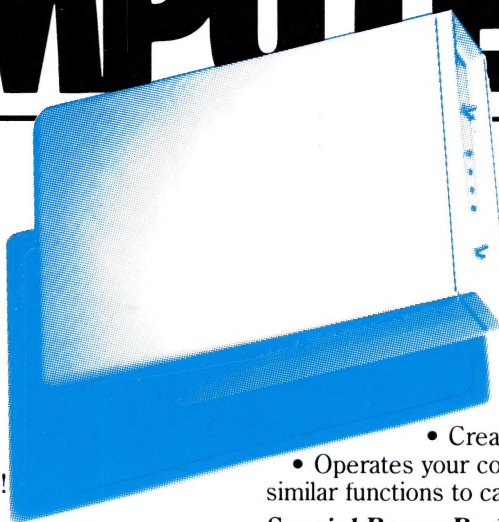
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